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HOWARD C. WARREN, PRINCETON UNIVERSITY
JOHN B. WATSON, JOHNS HOPKINS UNIVERSITY (*J. of Exp. Psych.*)
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VOL. XXIII. No. 4 July, 1916

THE PSYCHOLOGICAL REVIEW

A RECONSIDERATION OF JAMES'S THEORY OF EMOTION IN THE LIGHT OF RECENT CRITICISMS

BY JAMES R. ANGELL

University of Chicago

When Professor James first published his theory of emotion in 1884 he was subjected to a storm of ridicule such as has fallen to the lot of few psychologists. This both the theory and the author survived, and by his statement in the 'Principles,' but especially by the PSYCHOLOGICAL REVIEW article of 1894, he succeeded in pacifying most of his critics. For a number of years the revised doctrine enjoyed an ascendency but feebly disputed among English-speaking authorities. In 1900, however, came Sherrington's striking experiments dealing with the results of spinal transection in the dog, and James's theory once more fell under a shadow, this time apparently a more menacing shadow because cast by the solid wall of carefully observed fact. Now comes our fellow countryman, Dr. Cannon, with further considerations based on physiological experiments tending also to discredit views of the Jamesian type, although not in so many words attacking James's own formulation. Where the expert speaks cautiously and generalizes conservatively, the amateur and the dilettante rush boldly in and scatter sweeping indictments broadcast. Thus it has already come to pass that the critical queries of these eminent leaders among the physiologists of our time have been seized upon and exploited as sounding the knell of James's theory.[1] Unless some obstacle be thrown in the path, this

[1] Even careful writers like Ladd and Woodworth ('Elements of Physiological Psychology,' 1911, p. 525) allow themselves to use expressions which are certainly

movement will rapidly gain momentum and presently we shall hear that James's theory is forever disproved. The writer cherishes no illusions as to his power to furnish single-handed the obstruction necessary to slacken the pace of this tendency. But it is at least worth while to call attention to the present situation if, as he believes, the essential features of Professor James's view are profoundly true, and as yet quite untouched by any evidence, whether physiological or psychological, thus far established. It will serve to throw the issues into somewhat truer perspective if we devote a few moments to the earlier and more purely psychological criticisms to which James's formulation was subjected.

Unquestionably in the first article in *Mind* (Volume 9, 1884), James expressed himself in a manner to invite an unlimited amount of needless criticism. He said, for example (p. 189), "My thesis . . . is that *the bodily changes follow directly the perception of the exciting fact, and that our feeling of the same changes as they occur* IS *the emotion.*" Instantly the pack was after him in full cry. What! a description of emotion with no mention of pleasure-pain? An account too that took no notice of the cognitive features essential to every reputable emotion? What of the purely spiritual element so subtle and yet so obvious and so priceless in every esthetic and religious emotion? Moreover, was it not clear that many of the deepest and most pungent of emotions (*e. g.*, dry-eyed grief) were characterized by little or no bodily disturbance, a result wholly inexplicable in terms of James's theory? Most crushing of all, certain clinical cases of general anesthesia were put forward as disproving James's view because, despite the anesthesia, there

loose: ". . . it [the James-Lange-Sergi type of theory] seems to have been distinctly discredited by experimentation upon the lower animals." "Sherrington by 'appropriate spinal and vagal transection' removed from dogs, completely, all sensations of the viscera, and of the skin and muscles behind the shoulder." Although the point is of no great consequence for the general issue, the 'completely' above quoted is obviously at variance with Sherrington's own statement contained at a later point in this paper, and the 'distinctly discredited' is a decidedly stronger statement than Sherrington allows himself so far as concerns James's view, which he properly distinguished sharply from those of Lange and Sergi. Nor does it seem quite fair to characterize the reduction of emotion to a vasomotor basis, which marks the contention of Lange in opposition to James's view, a 'minor difference.'

were in the patients traces at least of certain basic emotions such as fear and anger and joy.[1]

Some of these critics, as has been already intimated, were mollified though not convinced by the elaboration of the theory in the 'Principles' (1890). Most of them were measurably content with the 1894 PSYCHOLOGICAL REVIEW article, but they stoutly maintained that this was in substance a recantation of heresy, a subscription to the true faith.[2] In part it was such. It modified such portions of the original statement as had led to gratuitous misunderstanding and it made clear that the positive and cardinal part of the doctrine had been left wholly unscathed by any of the attacks. A few irreconcilables of course remained. Some persons, as James himself ruefully remarks, can never be made to understand what the theory is. For some systems too, those of Wundt and his immediate disciples, for example, the Jamesian position is inevitably indigestible and unassimilable. But broadly speaking there has been very general assent to many of its features—certainly much wider assent than to any other single formulation. Professor Dewey,[3] apparently unconsciously following a lead earlier indicated by Paulhan in his insistence on the inhibitive features of emotion,[4] has taken the more significant aspects of the theory, attached them somewhat more explicitly than did James himself to certain Darwinian principles and re-edited the whole in a brilliant formulation which has suffered even more than James's by the inability of the public to understand it. So we come to the work of Sherrington and Cannon.

Sherrington's first experiments[5] were on five young dogs in which the spinal cord was severed in the lower cervical region. Thus, as the investigator states, sundering "from the brain all nexus with the thoracic, abdominal and pelvic viscera, except that existing through certain cranial nerves. It also cuts off all the blood vessels from the bulbar vasomotor center, except

[1] Compare D. Irons, *Mind*, N.S., 1894, 3, 77; *Philosophical Review*, 1897, 6, 242, 471, 626. W. L. Worcester, *Monist*, 1892–93, 3, 285.

[2] J. M. Baldwin, PSYCHOLOGICAL REVIEW, 1894, 1, 610.

[3] PSYCHOLOGICAL REVIEW, 1894, 1, 553; 1895, 2, 13.

[4] 'Les phénomènes affectifs et les lois de leur apparition.'

[5] *Proceedings of the Royal Society*, London, 1900, 66, 390.

for certain scanty communications through the cranial nerves. The skin and motor organs are, as far as the shoulder, likewise cut off from all communication with the brain. Therefore behind that level they are precluded from contributing to nervous processes of emotion either in their centripetal or their centrifugal phases. . . . If reliance be placed on the signs that are usually taken to signify pleasure, anger, fear, disgust, then these animals showed them as unmistakably after as prior to the transection of the cervical spinal cord. . . . Toward friends and enemies among their fellow inmates of the animal house, they displayed as markedly as ever their liking or their rage. . . . I saw fear notably displayed by one of the dogs. . . . The lowering of the head, the dejected half-averted face, and the drooped ears contributed to indicate the existence of an emotion as lively as the animal had ever shown us before the spinal operation had been made." The author then cites a number of other observations on these animals, all, however, of the same order. Further experiments are also reported on other animals with variations of technique. For example, the vagi were severed in certain cases, thus cutting off from the field of sentience the stomach, lungs, and heart. The diaphragm, however, appears in all these instances to have retained connection with the brain.[1] Control over the possible compromising of the situation by earlier experience laid down in the cortex was attempted by experiments on nine-weeks-old puppies, whose behavior it was thought would not be due to previously acquired cortical habits. For the considerations which I wish to urge this point is not very important one way or the other. But I doubt whether our animal psychologists would wish to lay any great stress on the emotional expressions of the average nine-weeks-old puppy as being free from the influence of previous experience.

The author concludes that "These experimental observations give no support to the theories of the production of

[1] The importance of the diaphragm in human emotion is so well recognized as to require no emphasis. C. J. Herrick in his 'Introduction to Neurology' says (p. 259) of Sherrington's observations: "The experiments are not very convincing and the problem is probably too complex for solution by so simple means as those here employed."

emotion quoted at the opening of this communication" (James, Lange, Sergi). "On the contrary, I cannot but think that they go some way toward negativing them. A vasomotor theory of the production of emotion seems at any rate rendered quite untenable." (This criticism applies to Lange and largely to Sergi.) "I would not be thought to impugn the importance of the study of such organic phenomena in connection with emotional mental states. The only respect in which the here given observations affect the position of affairs is that they, I think, render it necessary to attribute to these elements of emotion another significance than that imputed by the authorities quoted in my opening paragraph."

The author returns to the issue in his 'Integrative Action of the Nervous System' (pp. 255–258), after recognizing three possibilities, (1) that the psychic part of emotion arises first, and its neural correlate then excites the viscera, (2) that the same stimulus concurrently excites the mind and the nervous centers controlling the viscera, (3) that the emotional stimulus acts first on the nervous centers controlling the viscera whose reaction, as we apprehend it, is the emotion. James's view is identified with the third proposition, whereas Sherrington expresses himself as favorable to the first possibility in these words: "We are forced back toward the likelihood that the visceral expression of emotion is *secondary* to the cerebral action occurring with the psychical state. . . . We may with James accept visceral and organic sensations and the memories and associations of them as contributory to primitive emotion, but we must regard them as reënforcing rather than initiating the psychosis."

Reduced to its simplest terms I think Sherrington's view may be said to rest on the observed fact that judged by the behavior of the head and fore-limb segment of dogs which have undergone cervical spinal transection, fear, anger, pleasure, and disgust are not discernibly modified. This means that judged by such evidence the motor impulses which under the excitement of these emotional conditions normally pour into the muscles of the head and fore-limb region, are not notably reënforced by impulses from the visceral region, so

that the subtraction of the latter occasions no obvious enfeeblement of the former. How much the animals' consciousness may have been modified under the experimental conditions it is, as the author frankly recognizes, quite impossible to determine.

Moreover, strictly considered, Sherrington's conclusion that the visceral and organic sensations are secondary and not primary in emotion seems to be quite imperfectly supported by the evidence of his experiments. It is commonly alleged that some objects call out instinctive responses such as terror or fear in advance of any intelligent knowledge about them and that emotion is involved in a primitive way in the first experience of this sort. This is James's assumption, which I do not understand Sherrington to call in question. Loud sounds thus terrify some infants, fur is alleged to frighten others. James would hold that this drainage of sensory impulses into reflex motor pathways sets up sensory-affective waves which come to consciousness in a vivid way and combine with the residual perceptive processes cognitive of the object occasioning the disturbance. The time taken for this instinctive motor discharge to be reflected back into the sensorial region of the cortex is, in the case of the striped muscles, the fraction of a second; in the case of the unstriped muscles and glands somewhat longer, but even so, a very brief space of time is involved, so brief that the purely introspective problem of determining the order of events in the emotions of mature persons has generally been abandoned as unfruitful. In some instances the bodily reaction seems to come distinctly after the cognitive apprehension of the emotion-provoking stimulus; sometimes it seems to precede, sometimes to accompany. This on the basis of introspection merely. We have no conclusive evidence as to the extent to which these instinctive pathways originally involve the cerebral cortex. Experiments of the transectional kind indicate that most of them are cortical or at least brain affairs; but that possibly rage and some forms of fear may gain expression without the brain. On the whole it seems probable that in man practically all the emotions, even in their first exercise, implicate cerebral reflex arcs. In this sense the actual physiology of the original

emotional excitement is perhaps this: sensorial excitation, cortical or thalamic stimulation and immediate reflex motor and glandular innervation, occupying the fraction of a second; return wave of organic and kinesthetic sensory elements, occupying from a fraction of a second to several seconds, but ultimately fusing with already existing perceptual activity in the cortex; the entire state constituting the full-fledged emotion.

Evidently after a few emotional seizures, memory might begin to operate to reinstate vestiges of old excitement, even in advance of the arrival of some of the reflex organic sensory waves. James's point in this connection would be that we do not have the full characteristic feeling of emotion until this return wave from the organism has been registered. But evidently in many cases this may occur so quickly that we should not discern its temporal separation from the original stimulus.

The facts which Sherrington cites regarding the unmodified reflexes in the head end of the organism, regardless of visceral extirpation, can hardly be regarded as bearing crucially on this question of the order of events in the reflex circuit.

Turning now a moment to Cannon's position, we find him, on the basis of his interesting experimentation, stating in his volume entitled 'Bodily Changes in Pain, Hunger, Fear, and Rage' (pp. 279–80): "If various strong emotions can thus be expressed in the diffuse activities of a single division of the autonomic—the division which accelerates the heart, inhibits the movements of the stomach and intestines, contracts the blood vessels, erects the hair, liberates sugar, and discharges adrenin—it would appear that the bodily conditions which have been assumed by some psychologists to distinguish emotions from one another must be sought for elsewhere than in the viscera." "We do not 'feel sorry because we cry,' as James contended, but we cry because when we are sorry or overjoyed or violently angry or full of tender affection—when any one of these diverse emotional states is present—there are nervous discharges by the sympathetic channels to various viscera, including the lachrymal glands. . . . For this reason

I am inclined to urge that the visceral changes merely contribute to an emotional complex more or less indefinite, but still pertinent, feelings of disturbance in organs of which we are not usually conscious."

Dr. Cannon's statement of the causal sequence of events here may be correct or incorrect, but his conclusion seems to be an instance of argument by affirmation. Certainly there are nervous discharges into the viscera in emotion. On this Professor James and he agree with all the rest of us. But Dr. Cannon surely advances no evidence which touches the relative correctness of his own as against Professor James's estimate of the relation of this fact to the causation of the total emotional psychosis; and his selected instances of similar visceral activities found with distinguishable emotions can hardly be taken alone to afford the needed confirmation. James himself goes even further and comments upon the similarity of *peripheral motor* reflexes (*e. g.*, weeping) in quite dissimilar emotions such as grief and joy.

"This view that the differential features of emotion are not to be traced to the viscera is in accord with the experimental results of Sherrington who demonstrated that emotional responses occur in dogs in which practically all the main viscera and the great bulk of skeletal muscles have been removed from subjection to, and from influence upon the brain, by severance of the vagus nerves and the spinal cord. In these animals no alteration whatever was noticed in the occurrence, under appropriate circumstances, of the characteristic expressions of voice and features indicating anger, delight, or fear. . . . Evidence from the uniformity of visceral response and evidence from the exclusion of viscera are harmonious, therefore, in minimizing visceral factors as the source of differences in emotional states" (Cannon, ibid. pp. 280–281).

Clearly the main point Dr. Cannon has to make, in addition to those already urged by Sherrington, concerns the question whether emotions, assuming their intrinsic dependence upon some sort of organic excitation, can be differentiated and classified on the basis of their visceral components. To this inquiry he gives a negative reply because in all his experiments

in which various emotions have been elicited from his experimental animals, he finds the viscera implicated in ways which he regards as highly similar even when the emotions provoked are presumably quite divergent.[1]

Professor James, so far as I recall, nowhere set himself the task of attempting to differentiate emotions on exactly the basis suggested by Dr. Cannon's statement. Quite the contrary; he says ('Principles,' Volume II, p. 454): "Now the moment the genesis of an emotion is accounted for, as the arousal by an object of a lot of reflex acts which are forthwith felt, we immediately see why there is no limit to the number of possible different emotions which may exist, and why emotions of different individuals may vary indefinitely both as to their constitution and to the objects which call them forth. For there is nothing sacramental or eternally fixed in reflex action. Any reflex effect is possible, and reflexes actually vary indefinitely, as we know." That there are marked differences even in the visceral processes is perhaps sufficiently suggested by Pavlov's classical experiments on the flow of gastric juice which is provoked by hunger coupled with pleasurable emotion, and checked by fear or rage. This checking by fear and also by rage is cited by Cannon as an instance of an identical visceral reaction occasioned by different emotions (p. 277), because, as he says, "These emotions accompany organic preparations for action and . . . because the conditions which evoke them are

[1] If it should prove possible, on the lines suggested by the work of several contemporary physiologists, to differentiate emotions on the basis of the glandular products thrown into the blood, we might hope for a classification which would be on a more stable basis than any hitherto proposed. But even such procedure would in no wise prejudice the validity and importance of the issues raised by James, and it must be admitted that at present the difficulty urged by Dr. Cannon against accepting visceral activities as a valid basis for differentiating emotions from one another, holds in aggravated form. In other words, if emotions introspectively quite distinct have many glandular activities in common, we must either look to other glandular processes yet undiscovered to furnish the lines of demarcation, or abandon hope of a classification which will relate itself in any organic way to our common differentiations based on introspection and world-old opinion. To group together anger, fear, and jealousy, for instance, because they may perhaps possess common glandular features is not to furnish a classification likely to have much psychological interest. On the other hand, we must not prejudge unfavorably the possibilities of future physiological research in this field. The present writer would be particularly unwilling to seem unappreciative of the illumination afforded the general phenomena of emotion by recent physiological discovery.

likely to result in flight or conflict." James himself, it should be added, regards these two emotions as very similar and closely related.

James would certainly have to hold that, however much emotions may vary in their expression in different individuals and in the same individual, when *all* the reflex effects were taken into account, distinguishable emotions would always have variant bodily expressions. But this does not by any means preclude a considerable matrix of substantially identical visceral excitement for some different emotions. Their distinction from one another in such cases may be found in extra-visceral conditions, and particularly in the tonus of the skeletal muscles. Fear and joy may both cause cardiac palpitation, but in one case we find high tonus of the skeletal muscles, in the other case relaxation and the general sense of weakness. Many other illustrations of the same sort of thing will suggest themselves.

Exactly the same evolutionary reason which may explain very *divergent* peripheral motor phenomena in emotion as being adaptive to variant physical situations, may explain the highly *similar* visceral reactions upon which Dr. Cannon comments. Fear and rage may demand similar or even identical expressions of power-generating actions in the viscera, while justifying very different motor reactions at the periphery, and in point of fact this is just what we find. The evolutionary explanation is notoriously inadequate in the light of present knowledge, or better in the darkness of present ignorance, to account for *all* the phenomena of behavior. Yet no one wishes to throw it into the discard, and if it is played as Cannon plays it for visceral activities, there is no logical ground for refusing to use it in the case of the periphery.

We would therefore submit that, so far as concerns the critical suggestions of these two physiologists, James's essential contentions are not materially affected. That the instinctive impulses in the head segment of the dog should be literally unaffected by the removal of the central connections with the viscera is striking evidence of the physiological independence of this anterior segment; but it certainly affords no evidence that visceral organic sensations of human beings play no part

in emotional psychoses—a conclusion which Sherrington does not draw in this extreme form, but which careless readers have so drawn and which is flagrantly at variance with daily experience.[1] Nor does it prove in any way that the psychic state dubbed "emotion" precedes its "physiological expressions" so-called, a view for which Sherrington declares his preference. It is consonant with such a view, but also with James's view. Moreover, so far as the animals may be supposed to have been conscious of the reaction of the facial and fore-limb muscles, they had a good bit of the basis of the psychic stuff which James is always presenting, in season and out, as among the most essential features in our awareness of the self. In other words, no evidence which left facial and cranial muscles unimpaired would ever have seemed to him very convincing as ground for conclusions unfavorable to his theory. And as to the classification of emotion, he was a latitudinarian, holding that many groupings were possible and significant. To group on the basis of visceral reactions alone would presumably have seemed to him theoretically possible, but quite unimportant for any penetrating apprehension of the total situation, because disregarding a full half, and perhaps more, of the important organic reactions, to wit, the general peripheral and skeletal conditions.

James himself, could he but participate in this discussion, would, I am sure, be immensely more interested to discover and define the real facts than to justify any mere theory of his own. And I think he would perhaps urge that, after all controverted points were left aside, the main issues for which he would wish to contend are (1) the instinctive basis of emotional reactions, and (2) the invariable re-percussion upon the cortex of these reflex effects in the muscles, glands, and viscera. Phrase your doctrine so that these two great groups of facts are recognized and properly evaluated, and you may call your theory Jamesian or not as you please. You will at least have accepted what lies at the root of James's theory.

[1] The retention of the expressions of rage in decerebrate dogs suggests the extent to which instinctive motor phenomena may be preserved in the presence of operative injury which might well be supposed to disintegrate all emotional phenomena, and especially in view of the fact that in such animals other emotional expressions are practically abolished.

HEAD'S THEORY OF CUTANEOUS SENSITIVITY

BY HARVEY CARR
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On the basis of an experiment in nerve division, Head *et al.* have formulated a theory of cutaneous sensitivity which antagonizes the older conceptions based upon the work of von Frey, Goldscheider, *et al.* Owing to the wide and enthusiastic acceptance of the theory in many quarters, it is believed that a critical review[1] may be of service to students of psychology.

Head's first observations concerned the recovery of cutaneous sensitivity in patients in whom cutaneous nerves had been injured or severed. To obtain more reliable results, Head sectioned a branch of a cutaneous nerve innervating a part of his hand and forearm, and thoroughly examined the sensitivity of this part before and after the operation and during recovery. On a certain region of the area affected he found a total insensitivity when the skin was lifted away from the deeper lying tissues, but this area did mediate certain modes of sensitivity when in the normal position. He concludes that this sensitivity belongs to the deeper tissues and not to the skin itself. This is termed deep sensitivity, and it comprises an appreciation of a contact stimulus giving skin deformation, pain due to extreme pressure, muscular activity, and the roughness and locality of contact stimuli. Granted the facts, the conclusion seems valid that this sensitivity is mediated by afferent fibers other than those innervating the skin. This aspect of Head's work contributes nothing essentially new, though the evidence is much more decisive and clear cut than that given by previous methods.

This paper is concerned with cutaneous sensitivity proper.

[1] The summary given in this review of the experimental results and the theory as formulated is based upon the account as given in two of the Head papers. These are entitled "A Human Experiment in Nerve Division" by Rivers and Head, and "The Afferent Nervous System from a New Aspect" by Head, Rivers, and Sherren. Both papers were published in *Brain* (1905, 1908).

Head's theory assumes that peripheral nerves contain two kinds of afferent fibers innervating the skin. These are termed protopathic and epicritic. Roughly these two kinds of fibers differentiate themselves in the following respects:

1. Each has a certain specificity of function. The protopathic mediate pain, hair sensitivity, cold to stimuli of 26° C. and below, and warmth to stimuli of 37° C. and above. These possess a punctuate distribution on the skin, react with a subjective intensity greater than the normal, are rather disagreeable and poorly localized, and are prone to stimulate reflex activity. The epicritic mediate contact to stimuli not producing skin deformation, and cold and warmth to the intermediate ranges of temperature stimuli. The contact is distributed in spots, but the cold and warmth are not. These responses are accurately localized and mediate two-point discrimination.

2. They differ in phylogenetic age. The protopathic system is the older of the two.

3. They differ in extent of distribution. The protopathic has the wider distribution. Both are present in most parts of the skin, but the protopathic alone is found in the viscera and some parts of the skin.

4. They differ in their mode of distribution. The protopathic fibers belonging to different spinal nerves overlap to some extent in their cutaneous distribution, while this is not true of the epicritic fibers.

5. They differ in their regenerative capacity. The protopathic recover more quickly, and their time of recovery is a constant (about 7 weeks) irrespective of the length of the regenerating part. The recovery time of the epicritic fibers varies directly with the distance of the section from the peripheral end of the fiber.

6. Head further maintains that this dual division of conducting mechanism exists only for the afferent nerves—neurones of the first order. After the first synapse in the cord, there are four anatomically distinct conducting mechanisms, each possessing a specific conductive capacity. The functional differentiation here corresponds to the four qualities of contact, pain, cold, and warmth.

It has long been known that the four qualities of pain, contact, cold, and warmth are independent variables in spinal cord diseases as well as in such functional disturbances as hysteria; moreover, this independence has usually been explained in terms of an anatomical differentiation of conditioning mechanisms. Head's hypothesis of four spinal cord tracts is not based upon facts derived from his experiment in nerve division but upon these well-known dissociations due to spinal cord lesions. This aspect of the Head theory thus offers nothing new in the way of fact or theory, with the exception of his suggested localization of the tracts.

The Head conception antagonizes the older view only as to the peripheral mechanisms involved in cutaneous sensitivity. Previous studies on the normal skin had found that cold, warmth, contact, and pain were independent variables as to their distribution, and this fact is usually conceived on the assumption that there are four specific mechanisms which vary independently of each other in their distribution. Two conceptions are now possible: the differentiation may obtain for the end-organs alone, or for both end-organs and fibers. The first hypothesis assumes the existence of four specific kinds of receptor, but all fibers are alike in kind, conducting any impulses given them. According to the second conception, both fiber and receptor are specific in function, and there are four kinds of fiber in the nerve as well as four kinds of end-organ in the skin.

Head's formulation contradicts both possibilities of the older theory as to number of end-organs and fibers. He assumes two specific fibers rather than four or one. As to number of end-organs in the skin, Head makes no definite statements, but seven are demanded by the implications of the theory. The protopathic fibers mediate four functions, and the epicritic three. These functions common to a fiber differ not only qualitatively but also as to their distribution in the skin, and logical consistency demands a corresponding anatomical differentiation. Either each kind of fiber can be further subdivided, or the distinctions in function are conditioned by receptor differences.

The factual data upon which the theory is based consist of certain dissociations of the cutaneous functions. Head rightly admits that in order to prove his hypothesis of a dual nerve mechanism these data must fulfill two conditions. (1) The various qualities must fall into two independently variable groups: either group may be present while the other is absent. (2) Within the group all functions must invariably occur together: no internal dissociation is possible.

The first criticism is one of fact—the contention that the data do not meet the logical requirements of the theory. Head describes the sensitivity of six areas in support of his doctrine, and these results will be canvassed in order. Hereafter we shall use the prefix Ex. in referring to the two temperature qualities belonging to the protopathic system, as these are responses to extreme temperature stimuli. The prefix Md. will likewise designate the epicritic temperature functions as they respond to the medium range of stimuli.

1. *Marginal Zone.*—There was found immediately after the operation a small zone of peculiar sensitivity lying between the central insensitive area and the surrounding regions of normal sensitivity. The sensitivity of this marginal or intermediate zone was termed protopathic; hence the existence of pain, Ex. warmth, Ex. cold, and hair sensitivity is to be expected.

This expectation is hardly justified by the data as given. The operation produced an analgesia over a certain region. Outside of this region the sensitivity for pain was normal. For the most part the boundary between normal pain sensitivity and the analgesia was sharp and clear-cut and could be represented by a line. In other places the transition was gradual and not abrupt. The same situation obtained for the functions of contact, cold, and warmth. Generally speaking the gradual transitions were found on the forearm for all functions, while the hand exhibited boundaries of the linear character. It was thus possible on the hand to define the relative extent of the anesthesia for the four functions, and it was found that usually the four boundaries did not coincide. The relation between pain and contact is thoroughly described

in the text and well represented in the various figures. Where definition was possible, the boundary for pain was found to lie about 2 mm. within that for contact, except for a small area on the wrist where the reverse situation obtained. In the first case the area between the two boundary lines constitutes the marginal zone; because of its shape the second region is called the triangular area and this will be discussed later. The relation of the temperature boundaries to those for pain and contact along the marginal zone is not depicted in the figures and but few descriptive statements are given in the text. Fifty days after the operation the following record is given: "The loss of sensation to cold corresponded in extent with that of the loss of prick; but wherever the part was feebly sensitive to the latter stimulus, sensibility to cold seemed to be absent. To all degrees of heat the borders of the loss of sensation had remained unchanged, and the extent of the anesthesia even to temperatures between 50° and 60° C. uniformly exceeded that of the loss to prick." Later it is asserted of the region near the base of the thumb that "the border of the thermo-anesthesia probably lay slightly within that for sensibility for cotton wool." From these statements it is evident that the temperature boundaries did not coincide with those for pain or contact but probably lay between them. From this definition of boundaries it follows that this marginal zone lacks touch but mediates pain; that its outer half gives normal temperature responses while the inner half is thermo-anesthetic. This is not protopathic sensitivity as alleged. The descriptions of the sensitivity of this zone assert the absence of contact and the presence of pain and hair sensitivity; no mention is made of cold and warmth. In his discussion of the zone (pp. 46–47), Head speaks of a similar area which appeared three weeks after the operation and he admits that this surface was insensitive to all thermal stimuli. The ascription of protopathic sensitivity to the marginal zone presupposes that the operation produces a dissociation within the temperature functions, that the regions of thermo-anesthesia and normal temperature sensitivity were not separated by a line but by an intermediate strip which responded only to the extremes of

temperature stimuli. Such a strip was present after the thermo-anesthetic area had partly recovered its temperature functions, but this is a recovery phenomenon, and was not due to the operation. I have not been able to find any statement to the effect that such a zone of dissociated temperature sensitivity existed after the operation and before recovery commenced. On the other hand, many statements are made which indicate that the transition from normal sensitivity to thermo-anesthesia was abrupt.

2. *Glans Penis.*—The sensitivity of this area is alleged to be protopathic. Head found merely pain and Ex. cold. Ex. warmth was not present, and Head explains the exception in terms of the small size of the area and the usual paucity of warm spots. Hair sensitivity was absent but this lack forms no valid exception because of the absence of hairs.

3. *Viscera.*—Protopathic sensitivity is asserted of these regions. The description mentions only Ex. cold and Ex. warmth. Pain is not mentioned but the existence of this function is probably assumed, as practically all observers report that pain is mediated by these surfaces. Hair sensitivity is absent but this lack can not be regarded as a valid exception.

As is the case of the glans penis, these results on the viscera were not obtained from the experiment in nerve division. They were obtained from hospital patients. Head admits that the observations of hospital patients can not be wholly trusted; for this reason he operated upon himself in his study of cutaneous sensitivity rather than rely upon the observations of patients with nerve sections. It is thus possible that the extreme temperature stimuli applied to the viscera may have been identified by means of pain. Head admits that he himself in the earlier part of his experiment found some difficulty in avoiding this confusion (p. 28). There has been much experimentation and discussion as to the sensitivity of the viscera and pronounced differences of opinion obtain. It is not the purpose of this paper to evaluate the relative validity of the different findings. We merely wish to call attention to the fact that the sensitivity of the viscera is a moot question.

4. *Triangular Area.*—As previously mentioned the boundary of analgesia after the operation lay outside that of touch anesthesia for a short distance on the wrist. The region between these two boundaries because of its shape was termed the triangular area. Its dimensions were approximately 3 × 4 × 4.5 cm. It is asserted that this area manifested epicritic sensitivity immediately after the operation.

The existence of this area after the operation is an assumption, for it was not discovered until the removal of the surgical dressing 28 days after the operation. Head's assumption may be correct, but likewise the sensitivity of this area may be a recovery phenomenon as recovery was noted in other areas as early as 43 days.

It is asserted in several places that this area was totally insensitive to all forms of pain and cold stimuli; no painful or cold responses were ever obtained. The functions present were contact, hair sensitivity, and warmth to stimuli of 42°–48° C. In the second paper it is stated that warmth was elicited from stimuli of 36°–45° C. This list of functions deviates from the epicritic group in three important respects; it includes hair sensitivity, lacks Md. cold, while the stimulus range for warmth is more like that of the protopathic than the epicritic system, for the protopathic warmth is supposed to respond to temperatures above 37° C.

5. *Horsley Case.*—In the second paper Head refers to a case of dissociation resulting from an operation by Sir Victor Horsley. In the removal of a small tumor from the nerves at the base of the brain there resulted a disturbance of sensitivity over the one half of the face. The sensitivity remaining is termed epicritic. The functions noted as being present were contact and warmth in response to temperatures up to 43° C. This list conforms to the epicritic group with the exception of cold, of which no mention was made. One must note that the character of the lesion in this case is not stated. Possibly the conditions are not at all similar to a nerve section as in the Head experiment.

6. *Stages of Recovery.*—Two stages of recovery are asserted for the insensitive area. The protopathic system began to

appear in seven weeks after the operation while the epicritic group did not develop until the end of a year. One would gain the impression from this formulation that simultaneity of recovery obtains for all functions within each system.

The facts hardly justify this expectation. The order of recovery for the various functions is difficult to determine from the account as the description refers to different parts of the affected area and the time of recovery varies with the locality. I have been able to find the time of the first appearance of each of the seven functions for the same locality, viz., the proximal area of the forearm. These times in days are: pain, 56; hair, 86; Ex. cold, 112; Ex. warmth, 161; contact, 365; Md. warmth, 407; and Md. cold, 440(?). The only fact justifying a division into two groups, as was done by Head, is the longer time interval between the first appearance of Ex. warm and contact (204 days) than between any other two functions, viz., 49 days. Moreover, simultaneity of appearance does not obtain for the functions within the alleged systems. Since the functions of a group belong to a common kind of fiber, one would expect them to return practically at the same time. Several logical possibilities are open to Head in order to explain this temporal order of recovery within a system. (1) One can assume that it is due to the varying rates of regeneration of different fibers of the same kind. This assumption for the protopathic fibers would contradict the fifth proposition of his theory. Moreover, it would not account for the definite order of recovery of the seven functions. (2) The order of return within a system may be due to differences in the rate of recovery of the end-organs or receptors. There is good reason for supposing that the functional capacity of these receptors has been affected by the operation. End-organs tend to degenerate when their nerve is severed, and pronounced abnormal conditions of the cutaneous tissues were noted in the experiment. If recovery of end-organ as well as of fiber is necessary, it is logical to suppose that different rates of recovery would obtain for different structures. On this assumption Head's dual division of fibers is unnecessary to explain the facts of recovery. Why assume differences of both fiber and receptor

when either one alone will do as well? In other words, these facts of recovery can be conceived as well on the basis of seven mechanisms as in terms of two.

The assertion of two separate stages of recovery would seem to imply that there exists between the two a period in which no development occurs. As a matter of fact Head makes no assertions as to definite stages of this character. He admits that recovery is both gradual and continuous. Each function at its first appearance is defective and there is gradual improvement until normal conditions are reached. None of the protopathic group of functions attained complete recovery before the beginning of epicritic development. The periods of recovery of the two systems overlap to a large extent. Head merely contends that the protopathic system *begins* its development earlier than does the epicritic. Their final synchronous improvement is admitted.

The pertinent facts concerning order of recovery are these: The seven functions appear in a definite temporal order, one interval (204 days) between two successively appearing functions is much greater than the others, the recovery of each function is a gradual process, and all progress together in the later periods of recovery. These facts would indicate that a dual division is somewhat arbitrary. If stages are demanded, the assumption of seven is as feasible as Head's dual division.

The facts adduced from the above six lines of evidence are tabulated in such manner (Table I.) that one can easily observe to what extent these data fulfill the two conditions previously enumerated. The first column groups the seven functions into the two alleged systems. Columns 1–5 refer to the first five areas discussed. The mark X opposite any function signifies the presence of this function in that area. A dash (—) means the absence of the sensation. A question mark (?) indicates some doubt as to the fact. In two cases the space is left blank; these refer to the hair sensitivity of the viscera and the glans penis. Since the absence of hair sensitivity from these two regions forms no valid exception to the theory, the reader may regard these as though they were crossed. The sixth column states the time in days of the

first appearance of the seven functions for the proximal area of the forearm.

An inspection of this table reveals the fact that the data do not meet the logical requirements of the theory. There is one exception to the independent variability of the two groups.

TABLE I

DISSOCIATED FUNCTIONS

Functions	Marginal Zone	Glans Penis	Viscera	Triangular Area	Horsley Case	Stages of Recovery	Dentine and Tooth Pulp	Kiesow's Area	Cornea	Conjunctiva
	1	2	3	4	5	6	7	8	9	10
Protopathic:										
Pain	X	X	X	—	—	56	X	—	X	X
Hair	X			X	—	86				
Cold Ex.	—	X	X	—	—	112	—	X	X	X
Warm Ex.	—	—	X	—	—	161	—	X	—	X
Epicritic:										
Contact	—	—	—	X	X	365	—	X	—	—
Warm Md.	—	—	—	X?	X	407	—	X	—	X
Cold Md.	—	—	—	—	—	440?	—	X	X	X

The main deviations concern the dissociations within the groups. There are three cases of dissociation within the protopathic group and two for the epicritic. In the alleged protopathic areas essential functions are absent in three cases. In the two epicritic areas cold is absent both times. The importance of these dissociations within the groups must be emphasized. Head rightly maintains that a dissociation into two independently variable groups must be interpreted in terms of two distinct anatomical mechanisms. Likewise logic would demand that a similar dissociation within the alleged systems means additional mechanisms. In considering the data, the reader must dismiss all bias in favor of any definite number of mechanisms. One has as much *a priori* right to assume seven or four kinds of fiber as two. Our conclusions must be based wholly upon the evidence as given in the table. The question at issue concerns the number of independent variables. The writer is much inclined to believe that if a number of persons without knowledge of Head's theory were confronted with the given facts and asked to

determine the number of independent variables, very few of these would make such a division as that of Head. I am inclined to believe that the majority of such persons would conclude in favor of six or seven variables. In other words, the facts as given by Head do not support his theory; rather they can more easily be explained in terms of seven mechanisms, even though we accept the facts at their face value. The reader must remember that the validity of some of the facts may be questioned.

A second objection concerns the doctrine of a constant time for protopathic recovery. Head assumes that the time of recovery of the protopathic system is a constant irrespective of the location of the nerve section. He asserts that functional recovery depends upon fiber regeneration and that the time of regeneration of the protopathic fibers is a constant irrespective of the length of the regenerating part. This assumption is somewhat illogical if regeneration means actual growth through space. The doctrine is also controverted by the facts concerning the spatial order of recovery over the insensitive area. From the figures and the descriptions representing the progression of events it is evident that recovery first occurs for points nearest the nerve section and gradually extends toward the distal portions. This order obtains for both the protopathic and the epicritic systems. Since the regenerative length of those fibers ending in the distal portions is greater than for those innervating the proximal parts, this spatial progression is to be expected if the time of regeneration is a function of distance. According to Head's assumption, protopathic recovery should be uniform throughout the affected area. The facts indicate that the time for regeneration for all fibers is a function of distance, and one of the main arguments in favor of two kinds of fiber is thus invalidated.

Another spatial order of recovery is apparent from the account. Recovery progresses from the edges of the normal zone in toward the center of the insensitive area. The size of the affected area is gradually decreased by a contraction of its boundaries. This fact can not be explained by any of the assumptions of the theory. The phenomenon can be

explained by the hypothesis that the order of recovery is a function of the receptors. As we have noted, there is good reason for supposing that nerve section will produce a functional incapacity of the end-organs. Naturally the functional recovery of the receptors will occur after the regeneration of the fibers. Since this incapacity is a result of the abnormal trophic conditions of the cutaneous tissues, the degree of the disturbance will increase from the edges of the normal zone in toward the center of the affected area, for the nutritive condition of the marginal areas will depend in part upon the trophic condition of the adjoining normal zone. The receptors of the marginal areas, being less affected, will recover first after the recovery of the fibers.

A final objection concerns the application of the theory to peculiarities of functional distribution in the normal skin. Both kinds of fiber are found in most regions of the skin, but occasionally either may be absent. The sensitivity of peculiar areas is thus explained. All anomalous areas must possess either epicritic or protopathic sensitivity. The peculiar sensitivity of the viscera and the glans penis is thus due to the absence of the epicritic system. Granted the validity of the theory as applied to these two regions, difficulties are encountered in an extension to other areas.

1. The dentine and tooth pulp are said to mediate only pain. This fact can not be subsumed under Head's conception.

2. Pain is absent from Kiesow's cheek area. The sensitivity of this area could be regarded as epicritic if it were demonstrated that temperature spots were absent and that the area reacted only to the median range of temperature stimuli (26°–37° C.). It is doubtful if this restricted range of sensitivity obtains.

3. In the cornea only cold and pain are said to exist. This deviates from protopathic sensitivity in two respects. All sensitivity to warmth is lacking, while the range of sensitivity for cold is not restricted to stimuli below 26° C.

4. In the upper conjunctiva contact alone is said to be lacking. This form of sensitivity could be regarded as protopathic if the temperature spots did not react to stimuli of 26°–37° C.

The sensitivity of these four areas is listed in columns 7 to 10 of Table I. The evidence from these regions as well as that from the viscera and the glans penis must be considered in determining the probable number of independently variable systems. Considering the distribution of the seven functions in all of the areas the evidence in favor of two systems is far from conclusive.

In conclusion, the facts of dissociation speak in favor of seven sensory mechanisms, and such a conception will easily explain the spatial and qualitative orders of recovery. On this hypothesis one can assume a differentiation of both fiber and receptor, or limit it to the end-organs exclusively.

So far we have followed Head in his assumption that seven sensory functions were obtained by his experiment. We may now raise the question of the possibility of reducing these seven functions to the conventional four, viz., contact, warmth, cold, and pain.

1. It is possible that the hair and contact sensitivity represent but two stages in the recovery of the same mechanism. Both senses possess a punctuate distribution, and the two kinds of spots are for the most part identical in location, *i. e.*, over the hairs. Also, no case was given in which contact was present while hair sensitivity was absent. Hair sensitivity may thus be the defective response of the contact mechanism while in an abnormal condition.

2. The same conception will easily apply to the two cold sensations. Protopathic cold may represent but the first stage in the recovery of the cold mechanism. As a consequence of its defective condition, this mechanism will at first possess a high intensity limen; the spots will respond only to extreme cold stimuli and when these are placed directly over the receptor. As recovery progresses, the limen is gradually lowered and responses will occur for the medium ranges of temperature stimuli and for the areas between the spots. The only crucial exception to this hypothesis would be the presence of the epicritic cold in an area in which the protopathic cold is absent. No such case was found, for in both the alleged areas (the triangular area and the Horsley case)

no cold responses of any sort were obtained. Some positive evidence in favor of the conception of a single mechanism may be adduced; when protopathic cold first appears its intensity limen is much higher than 26° C., and this limen is gradually lowered until 26° is reached. Likewise, the epicritic cold starts with a limen near 26° and this gradually sinks to the body temperature. In other words, we are probably dealing with a single mechanism whose intensity limen is gradually decreasing with recovery, and the point 26° C. represents but an arbitrary boundary between two stages of recovery. In support of this conception the following quotations[1] are apropos: "The terminal phalanx of the thumb was certainly sensitive to cold below 17° C." (p. 12). "At first, during the earlier protopathic stages, no sensation of cold might be evoked by temperatures above 20° C.; but with rapid increase of this form of sensibility, the part became increasingly sensitive to temperatures up to 24° C. With this gradual improvement, the first-grade spots responded with increasing constancy to the same range of temperature. Five years after the operation, an area between the knuckles of the index and middle fingers, though highly sensitive, still remains in a purely protopathic condition. Within its limits lie many active cold-spots, but not one of these reacts to temperatures above 26° C., and many scarcely react to 24° C." (p. 60). The following statements are made in describing the return of the epicritic system: "Temperatures of 26.5° C. and 25.5° C. were said to be cool in the neighborhood of the wrist, although no other part of the affected area reacted at that time to anything above 24° C." (p. 73). "When the weather was favorable, temperatures of 27° C. began to be appreciated as cool" (p. 74).

3. The same conception will apply to the mechanism for warmth, though the evidence is more ambiguous. The gradual decrease of the intensity limen is evident from the following statements: "The terminal phalanx of the thumb undoubtedly responded to temperatures above 45° C." (p. 12). "About this time (October 8), the upper patch on the forearm became undoubtedly sensitive to temperatures of and above 45° C."

[1] These quotations are taken from "A Human Experiment in Nerve Division."

(p. 14). "On November 1, the back of the hand reacted for the first time to temperatures above 45° C." (p. 52). "At first, few heat-spots responded to temperatures below 45° C.; but as recovery progressed the first-grade spots began to react to 40° C. Two spots only were sensitive to 37° C. under favorable conditions. Even now that part of the back of the hand which remains in a condition of protopathic sensibility is still insensitive to temperatures below 37° C.; the temperature most favorable for evoking a sensation of uncomplicated heat still lies between about 44° C. and 48° C." (p. 59). Concerning the recovery of epicritic warmth the following statements are made: "On June 5, 1904, the affected area on the forearm responded to temperatures of 37° C. This sensibility to warmth rapidly increased, and on June 26 was obtained, even with 34° C." (p. 16). "Before the skin in the neighborhood of the wrist had become sensitive to cotton wool, we noticed that temperatures of 36° C. or even 34° C. occasionally caused a sensation of warmth" (p. 72). "The whole of the affected area on the forearm has become uniformly sensitive to temperatures above 35° C.; even 33° C., under favorable conditions, produced a sensation of warmth" (p. 75).

This gradual change in the threshold during recovery also obtains for pain. The limen at first was very high; gradual improvement occurred during the protopathic period, but the normal threshold was not attained until long after the beginning of the epicritic stage of recovery.

Two crucial exceptions to this hypothesis of a single warmth mechanism are urged. It is asserted that epicritic warmth was found in two areas in which protopathic warmth was lacking. In the Horsley case the patient stated that a temperature of 55° C. was neither hot nor cold, but that 43° C. was undoubtedly warm. This evidence is hardly decisive as the lesion involved may be of a different order from that of a nerve section, as in the case of Head. The inability to appreciate properly a temperature of 55° C. may be due in part to the absence of pain from this area. Also the range of temperature sensitivity is not strictly epicritic in character. The triangular area was sensitive to stimuli from 42° C. to 49° C.

after the operation. Again, this is not a true epicritic warmth, and the inability to respond properly to the higher temperatures may have been due to the analgesia of this region. These cases present as much difficulty to the Head theory as to the hypothesis of a single warmth mechanism.

In the formulation of a theory of cutaneous sensitivity too much weight should not be given to the facts obtained by the methods of this experiment. As yet little is known of the relation between functional recovery and the regenerative process. The nerve section produced an extremely abnormal condition of the cutaneous tissues. The experimenters are dealing with the functional capacity of mechanisms in a highly abnormal state, with a situation containing a multitude of unusual and *unknown* conditions. Naturally, various peculiarities of sensitivity are to be expected with such a situation, and it is possible that all such peculiarities are to be explained in terms of these unusual and unknown conditions resulting from the operation.

The Head experiment has been attacked on a factual basis. The work has been repeated by several experimenters, and we shall briefly summarize the results of one of these investigations, viz., that of Trotter and Davies.[1] Apparently their work was performed with as much care and attention to detail as that of Head. They sectioned seven nerves in succession in the same individual. Comparison with Head's results is often difficult because of slight differences in method and technique. Many warm responses were rejected as being hallucinatory in character. Contact stimuli were used which were sufficient in strength to awaken deep sensitivity, and introspection was relied upon to differentiate between contact and pressure.

These investigators discovered but four sensory functions. The transition from the region of normal sensitivity to the insensitive area was never abrupt; between the two was found a marginal zone of defective sensitivity. The extent of the anesthesia for the four functions coincided in the main, but their boundary lines were independent variables. A definite temporal order of recovery for the four qualities was not

[1] *Jour. of Physiol.*, 38.

evident; in the main their recovery was synchronous. Touch came first, pain and cold followed quickly, while warmth came in somewhat later. But one spatial order of recovery was noted; recovery first occurred for the points nearest the section, the line of progress followed the nerve trunk and then spread out laterally. Two adjacent branches were once severed, leaving in between the affected areas three small islands of sensitivity which were supplied by a branch not sectioned. In one of these islands was found a small V-shaped area which mediated contact but no pain nor temperature. This area certainly could not be subsumed under either one of Head's two systems of cutaneous sensitivity. These authors conclude that their facts indicate that the skin possesses four independently variable functions and hence they assert the existence of four peripheral mechanisms. It is assumed that the differentiation includes both fiber and end-organ.

It is not our purpose to evaluate the relative validity of the two experiments nor to force upon the reader any definite conclusions. Rather we wish to combat the rather prevalent tendency to a ready and uncritical acceptance of the Head formulation.

THE THEORETICAL FOUNDATIONS OF WUNDT'S FOLK-PSYCHOLOGY

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Wundt's folk-psychology constitutes an integral part of his philosophical system. In some respects it must be regarded as the crowning achievement of his thought, inasmuch as its theoretical foundations presuppose all of his former work. In order to gain a proper setting for our critical considerations, we must begin with a somewhat detailed discussion of certain general concepts employed in Wundt's philosophy. Without a clear comprehension of these a criticism of his folk-psychology would not be feasible.

I. Wundt's Concept of Creative Synthesis

The term 'voluntaristic' characterizes Wundt's psychology —in contradistinction to that of other schools, such as the Associationist, Herbartian, and others—as viewing all psychic phenomena as the expressions of the will, but of the will in the broadest possible sense of the term. To Wundt the will is not a metaphysical concept, as it is to Schopenhauer. It is rather a principle that states the fundamental nature of all psychic life, from the simplest to the most complex processes. It gives expression, in the form of a principle, to the empirical facts about the mind—the psychological facts as they are borne out by an analysis of psychic experience and by an interpretation of psychological experiments.

Wundt regards the sensations (*Empfindungen*) and the feelings (*Gefühle*) as the two ultimate and irreducible elements of psychic life. They do not occur as concrete realities, being the abstract products of logical analysis. In the world of reality we only experience complex psychic phenomena compounded of those elements. The psychic elements are only real in the sense that they are constant components of all

psychic experience. But no psychic phenomenon is merely the sum of the component sensational and emotional elements. Invariably it is something new over and above the sum of the parts that enter into the compound. Thus all temporal and spacial ideas, for instance, are not equal to the sums of the separate sensations and feelings that constitute their elements. A chord is not equal to the sum of all its component tones: it is rather, on its psychological side, a new and unique experience. All psychic phenomena are therefore creative products of synthesis: they are, when seen from this point of view, acts of *will*. This justifies the term 'voluntaristic' as referring to that fundamental trait of the mind by which all psychic processes are creative. As we see, Wundt extends the concept of creative synthesis from the highest forms of apperceptive processes—which we witness in intellectual and artistic pursuits, where the creativeness is so obvious—to the entire realm of psychic life.

The principle of creative synthesis, as the one cardinal principle of psychic life, embraces the three principles of psychic causality which Wundt cites; namely, the principle of psychic 'resultants,' the principle of psychic relations, and the principle of psychical contrasts.[1] They pertain to the same content viewed from different angles.[2]

A word must here be said about the counterpart of the principle of creative synthesis; namely, that of the heterogeny of ends (*Heterogonie der Zwecke*). According to Wundt, every causal relation when reversed becomes a teleological one, inasmuch as the two principles of cognition, causality and teleology, do not exclude each other, but are complementary modes of bringing phenomena into logical relation. Thus the principle of creative synthesis, as a causal principle, can be reversed into a teleological one; namely, that of the heterogeny of ends. It applies to the same facts of psychic life as the former, but from a different point of view. What is cause and effect in one case is means and end in the other. "Es [handelt] sich eben bei dem Prinzip der Heterogonie um kein

[1] 'Outlines of Psychology,' 2d Engl. ed., 364 et seq.; 'Physiologische Psychologie' (5th ed.), 3, 778 et seq.

[2] 'Physiol. Psychol.,' 3, 787.

neues Prinzip, sondern nur um eine durch die besonderen Bedingungen nahegelegte teleologische Umformung der causalen Prinzipien des psychischen Geschehens. . . ."[1] It is important to emphasize this relation of the two principles, in order to understand the significance which Wundt attributes to the heterogeny of ends in the psychic development of the individuals as well as of the group. It must also be stated in this connection that as an interpretative principle of cultural phenomena not the causal principle but rather the teleological one (the heterogeny of ends) is of paramount importance. This is the case because the psychic phenomena in cultural development, on account of their complexity on the one hand and the discrepancy of their causes and effects on the other, are not interpretable progressively from the causes to the effects, but rather regressively from the given ends backwards to the motives. Theoretically the heterogeny of ends is a principle of universal validity. Wundt elaborates its application especially in connection with the interpretation of the development of ethical ideas out of non-ethical or rather pre-ethical ones.

In keeping with the nature of psychic causality, according to which an effect is not equal to its cause, the heterogeny of ends implies that in psychic development the ends attained are not equivalent to the purposes embodied in the motives. Between the motives and their ends there arise as unintended by-products secondary 'resultants' not implied in the motives, and thus is brought about a constant discrepancy of motives and ends. In a chain of motives and ends these unintended resultants, as well as the purposed end, take the form of new motives. Thus a constant shifting of the purposes takes place, which leads Wundt to speak of a heterogeny of ends.

II. The Concept of Psychic Actuality

The concept of creative synthesis is supplemented by that of psychic actuality. This concept expresses the fundamental characteristic of Wundt's conception of psychic life, and distinguishes his psychology from those other forms that conceive

[1] 'Physiol. Psychol.,' (5th ed.), 3, 789–790.

the psyche as a substance analogous to that of the physical world. According to Wundt the phenomena of psychology are *toto coelo* different from those of the natural sciences in their relation to the investigating subject. It is of the very nature of the natural sciences that their objects be thought to exist in an objective world distinct from the subject. They exist as if there were no subject. This conception of the purely objective world of natural phenomena becomes possible through an abstraction from the observing and correlating subject. This abstraction involves the postulation of a physical substratum to which all natural phenomena must be referred as to the underlying principle. The hypothetical substratum thus postulated takes the form either of matter or of energy. In this way the natural sciences view their phenomena through the medium of an auxiliary concept; namely, that of the substantiality of their objects. Over and against this, psychology does not approach its objects by way of an abstraction from the subject. It views them 'immediately' (*unmittelbar*), since they are given in the consciousness of the subject itself. Those psychologists who postulate a soul-substance ignore the intrinsic nature of the objects of their investigation, and have fallen into the pitfall of an untrue analogy of the psychical with the physical world. In contradistinction to physical substantiality, Wundt characterizes the subject-matter of psychology as the actuality of psychic life. This actuality defines 'the nature of mind as the immediate reality of the processes themselves.'[1]

The distinction between physical substantiality and psychical actuality determines likewise that between physical and psychical causality. The terms of the one form of causality are quantitative, those of the other are qualitative.[2] Physical causality is characterized by the quantitative equivalence of cause and effect—a fact which finds its expression in the principle of the preservation of energy. Psychical causality, as implied in the concept of the creative synthesis, involves qualitative disparity of cause and effect. "Es gibt absolut

[1] 'Outlines,' 357.

[2] Wundt, 'Logik' (3d ed.), 3, 276.

kein solches [*i. e.*, psychologisches] Gebilde, das nicht nach der Bedeutung und dem Wert seines Inhaltes mehr wäre als die blosse Summe seiner Faktoren oder die blosse mechanische Resultante seiner Komponenten."[1] By juxtaposing the constant values of physical energy to the creative synthesis of psychic energy, Wundt gains specific psychological connotations for his concept of evolution.

III. The Bearing of Creative Synthesis on the Concept of Folk-Soul

Wundt identifies the growth of psychic life with the increase of qualitative 'Wertgrössen,' which concept he contrasts with that of the quantitative 'Grössenwerte' of the physical world.[2] This clever play of words contains *in nuce* the essence of Wundt's philosophy. The concept 'Wertgrössen' implies the teleological factor which Wundt introduces into his conception of psychic evolution. The idea of purpose (*Zweck*) is an integral part of Wundt's concept of voluntaristic psychology. The intrinsic nature of man is his psychic life. But, as we have seen, all psychic processes are voluntaristic, are products of a creative synthesis—are acts of will, if you like. These processes are therefore, by their very definition, purposive. Thus the consistent conclusion is that the existence of man finds its purpose in the creation of psychic life;[3] but this purpose of existence is not limited to the life of man. The individual human being is but a link in the chain of psychic evolution. Life in the entirety of its expressions is the self-manifestation and self-evolution of the psychic. Nature as the physical prerequisite of the psychic is the 'Vorstufe des Geistes'; and, inversely, the psychic is the 'vorauszusetzender Zweck des organischen Lebens.'[4]

The principle of creative synthesis defines the nature of this psychogenesis in terms of psychic causality. This principle, which, as we have seen, characterizes all our psychic processes as creative productions over and above their con-

[1] 'Logik,' 3, 274.
[2] *Ibid.*, 276.
[3] Wundt, 'System der Philosophie' (3d ed.), 2, 238–239.
[4] *Ibid.*, 147.

stituent parts, characterizes them, in short, as 'voluntaristic,' applies to all psychic life in general, from its lowest to its highest forms. From this point of view Wundt's position in the discussion of the relation of reflexes to volitions obtains its deeper significance. Volitions are not differentiated mechanical reflexes, but rather reflexes are mechanized volitions. Thus in the successive stages of evolution the volitions lay claim to priority. Wundt demonstrates this by the fact that, even in the very lowest forms of life, reactions are not mechanical but purposive, and thus characterized in the same way as our own psyche.

Wundt's theory of psychogenesis gains its immediate significance for the concept of folk-psychology through the fact that the universality of creative synthesis obtains not only for the continuous succession of steps which lead from our psyche down to inorganic nature, but also for that whole sphere of psychic life which, as Wundt assumes, leads beyond the individual psyche into the realm of the over-individual life of the community (der Gemeinschaft). The creative synthesis which characterizes the intrinsic nature of all psychic compounds, and of all interconnections of these compounds in the psyche of the individual, is found repeated, according to Wundt, in a strictly analogous way, but on a higher level of evolution in the psychic life of the community or the folk. The reality of the folk-soul is involved in the extension of this principle beyond the individual psyche. As the psyche of the individual is built up in the form of a progression of superimposed syntheses, so the folk-soul is a synthesis of syntheses: it is something creatively new, not equal to the sum of its elements, that is to say of the individuals of which it is composed.[1] Wundt expresses this idea clearly in the following sentence: "Aber wie nicht psychische Elemente in isoliertem Zustande, sondern ihre Verbindungen und die aus diesen entspringenden Produkte das bilden, was wir eine Einzelseele nennen, so besteht die Volksseele im empirischen Sinne nicht aus einer blossen Summe individueller Bewusstseinseinheiten, deren

[1] 'Darum ist das gemeinsame Leben niemals eine blosse Addition individueller Wirkungen,' *Deutsche Rundschau*, 1891, 200.

Kreise sich mit einem Teil ihres Umfangs decken; sondern auch bei ihr resultieren aus dieser Verbindung eigentümliche psychische und psychophysische Vorgänge, die in dem Einzelbewusstsein allein entweder gar nicht oder mindestens nicht in der Ausbildung entstehen könnten, in der sie sich in Folge der Wechselwirkung der Einzelnen entwickeln."[1]

IV. The Folk-Soul

Wundt maintains that the folk-soul is no less real than the soul of the individual. In order to understand the line of thought that leads up to this assertion, it is necessary to recall what has been said about his conception of psychic actuality. The concept 'soul,' as used by Wundt, does not refer to a substance, be it materialistic or spiritualistic, but rather to the immediateness, the actuality, of psychic experience. Thus the soul of the individual, being deprived of the connotation of a substantialistic substratum, is an abstract term for an entity of concrete psychic experiences. "Unter der individuellen Seele verstehen wir die unmittelbare Einheit der Zustände eines Einzelbewusstseins."[2] This same conception of 'soul' as psychic actuality leads Wundt to postulate the reality of the folk-soul. As we have seen, he defines the folk-psychological phenomena as a sphere of psychical facts, which, while claiming the individual souls as their constituent elements, represent a new and peculiar creative synthesis distinct from the component parts. The concept 'folk-soul' refers in exactly the same way to the entity of these over-individual psychic facts as the individual soul refers to that of the psychic experiences of the individual. The essential connotation of the folk-soul, like that of the individual soul, is that it is an actuality, not a substance. Now the psychic facts of the over-individual group, as empirical facts, are according to Wundt as real as the psychic life of the individual. Therefore, so argues Wundt, the term 'soul' is equally justifiable and equally applicable in the case of folk-psychological phenomena as it is

[1] 'Völkerpsychologie' (1st ed.), I, 1, 9–10; see also 'Probleme der Völkerpsychologie,' 1911, p. 13.

[2] 'System d. Phil.,' 2, 148.

in that of individual psychology.[1] The axiom of voluntaristic psychology is, 'So viel Aktualität so viel Realität."[2] Therefore the folk-soul, as an actuality, is a reality.

A psychology, says Wundt, that abides by the conception of a soul-substance, can never comprehend the reality of the folk-soul, because a soul-substance is necessarily bound to the physical entity of the individual. "Ist die Seele ein beharrendes Wesen, wie die Substanzhypothese annimmt, ein geistiges Atom . . . , so hat selbstverständlich nur das Individuum wahre Realität."[3] To those who state that the folk-soul is a fiction and a production of the mythological imagination, Wundt replies that the conception of the soul as a substance is mythological rather than that of the actuality of the folk-soul, and hence of its reality.[4] The idea of a soul-substance, says Wundt, is a survival of mythical animism.

This is the line of thought that induces Wundt to postulate folk-psychology as an independent science, with its own particular realm of problems. Its existence is as justified as that of individual psychology. Wundt defines it as the study of the folk-soul ('die Lehre von der Volksseele').

Wundt's plea for folk-psychology is apparently founded on a rigid construction of logical thought. The well-balanced succession of premises and conclusions offers a good example of Wundt's argumentative brilliancy. The line of thought is enticing; and still the one decisive point in his argument for the reality of the folk-soul is gained by a subtle *coup d'état.*

The *raison d'être* of folk-psychology is at the mercy of the thesis of the reality of the folk-soul. This reality, as we have seen, is based on the idea of psychical actuality—a concept taken from the psychology of the individual. In individual psychology the concept 'actuality' acquires its meaning through the fact that the phenomena at hand are *immediately*[5] perceived in contradistinction to the mediate cognition of

[1] 'Probl. d. Völkerpsychol.,' 1911, 13, 20.

[2] 'Logik,' 3, 293–294.

[3] 'Logik,' 3, 293; 'Syst. d. Phil.,' 2, 188.

[4] 'Völkerpsychol.,' 1, 1, 8–9.

[5] I use the terms 'mediate' and 'immediate' for Wundt's terms 'mittelbar' and 'unmittelbar.' 'Indirect' and 'direct' would only convey the meaning approximately.

the natural sciences, which must postulate a substance as the extra-subjective substratum of their phenomena. The immediateness of experience is the fundamental connotation of psychic actuality. The condition in question is fulfilled in the case of individual psychology by the intrinsic and irreducible nature of consciousness. But what about the folk-soul? The folk-soul is by definition an over-individual synthesis. The psychic phenomena of the folk-soul are by definition not contained in the psyche of the individuals as such; but immediate psychic experience is—again by definition—confined to the consciousness of the individual. How then can there be an *immediate* experience of an over-individual synthesis? And what sort of a meaningless thing is an over-individual actuality of psychic life? But if there is no over-individual actuality, then there can be no folk-soul. The one falls with the other. The *contradictio in adjecto* which we here encounter in Wundt's argument lies in the following premises: psychic actuality is the immediateness of experience; the folk-soul is an over-individual synthesis. Wundt bridges the gap by ignoring at the decisive point in his argument the 'immediateness' of psychical actuality.

V. The Relation of the Individual to the Group

Having discussed in abstract terms the flaw in Wundt's plea for folk-psychology by pointing out his self-contradictory usage of concepts, let us investigate for a moment somewhat more concretely the same break in argumentation from another point of view; namely, from that of the relation of the individual to the group.

Wundt states categorically that folk-psychology deals with the psychology of language, religion (*Mythus und Religion*), and custom. These three types of cultural phenomena are the achievements *par excellence* of the folk-mind (*Volksgeist*). Not the individuals, but the group (*die Gemeinschaft*), is the creator of language, religion, custom. Of course, the group consists physically of a number of individuals; but those folk-psychological phenomena, so argues Wundt, represent a higher syn-

thesis that transcends the scope of individual consciousness.[1] He says, "Sie [*i. e.*, die Erlebnisse und Erzeugnisse geistiger Gemeinschaften] unterscheiden sich dadurch von den Synthesen des individuellen Bewusstseins, dass sie sich aus Bestandteilen *eines* Bewusstseins niemals erklären lassen, sondern auf einer geistigen Wechselwirkung vieler beruhen, die sich zu den genannten Vorgängen ähnlich verhalten, wie die Vorstellungs- und Willenselemente des Einzelbewusstseins zu den zusammengesetzten Vorstellungen und Willenshandlungen des einzelnen."[2] Misled by the analogy between the synthesis of psychical elements in the individual and the synthesis of the individuals in the group, Wundt becomes entangled in the illusory problem of the relation of the individual to the group.

This problem is no less an illusion than the old one of the relation of the particular to the universal, of which indeed it is but a specific application. The illusory nature lies in the fact that, when speaking of the particular and the universal, we are not operating with concepts of different objects, but rather with different conceptual abstractions of the same object. The individuals are the group, and the group is the individuals. The two terms represent different modes of conceptualizing the same thing. Wundt puts the problem thus: Is the individual as such, or is the group as such, the creator of language, religion, and custom? He states correctly, in opposition to the intellectualistic school of psychology, that it is not the individual as such; but at once he falls into the opposite error, and asserts that the group as such, the over-individual synthesis, is the creator of cultural phenomena. Wundt's position is no more consistent than is that of his adversaries. Logically a collective term is an abstraction from its analytic components, and the latter again are an abstraction from the former. Correspondingly, in our case the group is an abstraction from the individuals, and the individuals are an abstraction from the group. Thus Wundt's juxtaposition of the individuals as such, and the group as the over-individual synthesis, is an absurdity. A result of the contradictions in which Wundt becomes en-

[1] 'Probl. d. Völkerpsychol.,' 24.
[2] 'Logik,' 3, 295.

tangled is the vagueness with which he continually treats the relation of the individual to the group as soon as he attempts to demonstrate this relation concretely.[1]

The error in Wundt's position is determined from the outset by the way in which he formulates his problem: Is the individual as such, or is the group as such, the creator of language, religion, and custom? The difficulty thus involved arises from a confusion of the two distinct points of view from which the individual can be conceived. From the one point of view the individual is the subjective entity as experienced "immediately" (*unmittelbar*) in consciousness. This subjective individual experiences himself as autonomous. It is the individual of psychical actuality and of indeterminism. From the other point of view the individual is society and he is history. He is determined psychically by his cultural milieu. He is the individual of determinism, and the object of culture-history. We avoid the problem of determinism versus indeterminism, and we do not, as Wundt does, entangle ourselves in its meshes, if we distinguish clearly between these two points of view. Wundt gains the concept of the group as an over-individual synthesis by viewing the individual only from the first point of view; namely, as an autonomous monad.[2] Of course the individual as such cannot be brought into *rapport* with culture-historical problems when approached from this standpoint. Since language, religion, and custom are by definition psychical and historical phenomena—in short, cultural phenomena—the only point of view from which their study is conceivable is that of culture-history. But from this point of view, the individual, as we have seen, is history, he is society; he is, in brief, the ζωὸν πολιτικόν.

To conceive the individual historically—and by this I mean at the same time socially and culturally—as an autonomous entity is as meaningless as to study the course of a river independent of the geology of its bed. The ζωὸν πολιτικόν has *sui generis* a psycho-historical setting, it has a culture. And this culture is nothing accessory, it is not cast in the

[1] See, for instance, Wundt, Menschen- und Tierseele (4th ed.), 509.

[2] 'Syst. d. Phil.,' 2, p. 204.

mould of an autonomous individual; but language, religion, custom *are* from the historical point of view the individual, they *are* the group, they *are* the ζωὸν πολιτικόν.

The result to which Wundt's distinction between the individual soul and the folk-soul leads is nicely borne out by the following analogy, to which he repeatedly calls attention in his different works. In his individual psychology, Wundt designates the ideas and the emotions as the analytic components of the psyche, and defines the third class of psychic phenomena, the volitions, as a synthesis of the former two. Since ideas, emotions, and volitions thus make up the individual soul, Wundt, consistent with his idea of higher syntheses, is induced to find the corresponding division in the folk-soul. He actually goes so far as to correlate language, religion (*Mythus und Religion*), and custom—the elements of the folk-soul—with the ideas, emotions, and volitions, respectively, of the individual soul. "Die Sprache enthält die allgemeine Form der in dem Volksgeiste lebenden Vorstellungen und die Gesetze ihrer Verknüpfung. Der Mythus birgt den ursprünglichen Inhalt dieser Vorstellungen in seiner Bedingtheit durch Gefühle und Triebe. Die Sitte endlich schliesst die aus diesen Vorstellungen und Trieben entsprungenen allgemeinen Willensrichtungen in sich. . . . So wiederholen sich in Sprache, Mythus und Sitte gleichsam auf einer höheren Stufe die Elemente, aus denen sich der Tatbestand des individuellen Bewusstseins zusammensetzt."[1] The superficiality of this analogy is manifested by the altogether arbitrary selection of the attributes of language, religion, and custom. I can conceive of no reason why mythology and religion, for instance, should not be correlated just as well with the ideas or the volitions as with the emotions. Furthermore, it must be borne in mind that Wundt's tripartite division of culture into language, religion, and custom—a division which is of course convenient for the above analogy—is in itself altogether arbitrary. Why social organization and technology, for example, should not find coördinated divisions is incomprehensible. The correctness of

[1] 'Probl. d. Völkerpsychol.,' 29–30; see also 'Logik,' 3, 232; 'Völkerpsychol.,' I, 1, 26, 27.

this statement is, indeed, demonstrated by the fact that in his latest work on folk-psychology, in his 'Elemente,' Wundt himself ignores the tripartite division in favor of a consideration of all categories of cultural phenomena. The above analogy between the elements of the individual soul and those of the so-called 'folk-soul' is no less crude than the analogy sometimes drawn between the state and a physiological organism on the basis of certain superficial similarities.

VI. The Psychogenesis of the Folk-Soul

In his folk-psychological terminology, Wundt introduces the concept 'social will' (*Gesamtwille*), which, analogous to the concepts 'folk-soul' and 'social mind' (*Gesamtgeist*), corresponds on the social side to the will of the individual. To be sure, the distinction which Wundt makes between the concepts 'folk-soul,' 'social mind,' and 'social will' is frequently far from being clear. He is inclined to use especially the term '*Gesamtwille*' in a way that demonstrates clearly to my mind the line of thought that leads him to the idea of social life as an over-individual synthesis. My point is—and it is probably profitable to state it at this point—that Wundt derives the idea of the folk-soul from the collective actions of the group as an *organized* social entity. At times one even gets the impression that it may be derived in a superficial way from the legally organized state of the present day. For instance, while trying to demonstrate that the reality of the group is of a higher order than that of the individual, Wundt states: "Der praktisch bedeutsamste Beweis scheint mir freilich darin zu liegen, dass die Normen des Rechts nur aus einem realen Gesamtwillen jene verpflichtende Kraft schöpfen können, vermöge deren sie ihre unbedingte Herrschaft über den Einzelwillen behaupten."[1]

It is significant that Wundt cites criminal law as a specific example. A similar specification of the social will in terms of organized society is expressed in the following passage: "Nun findet sich der Wille des Einzelnen eingeschlossen in einer

[1] Wundt, 'Ueber das Verhältnis des Einzelnen zur Gemeinschaft,' *Deutsche Rundschau*, 1891, 203.

Willensgemeinschaft, die mit ihm in fortwährender Wechselwirkung steht, so dass er, vom Gesamtwillen beeinflusst, selber wieder nach Massgabe der erreichten individuellen Entwicklung diesen bestimmt. So ist der Einzelne zunächst Mitglied eines Stammes, einer Familie, einer Berufsgenossenschaft, dann bei sich erweiternder Willensentfaltung Glied einer Nation, eines Staates, um schliesslich mit diesen höheren Willenseinheiten teilzunehmen an einer . . . Willensgemeinschaft der Kulturvölker."[1] Bearing this rendering of the social will in mind, and recalling that language, religion, and custom are, according to Wundt, the creations *par excellence* of the folk-soul, it is fair to infer that these cultural achievements are conceived by Wundt as created by the group as an *organized* social unit. That this is his meaning, is implied in the following statement:

"In der Tat bilden ja Rechtsordnung und Staat nur hoch entwickelte Formen eines gemeinsamen Lebens, das von frühe an in der eine Volks- oder Stammesgemeinschaft verbindenden Sprache, in den ihr eigentümlichen religiösen und mythologischen Anschauungen, endlich in den für alle verbindlichen Normen der Sitte sich äussert."[2]

While from an *a priori* point of view it may seem plausible enough that language, religion, and custom are the evolutionary products of the social group as such, it is easy for modern anthropology to point out that the homogeneity and continuity of development as implied in the psychogenesis of the organized group are not borne out by empirical data. We do not find types of language, of religion, of mythology, of custom grouped in such a way as to justify us in viewing cultural evolution as a single line of development. For instance, we find the Athapascan-speaking Navaho in absolute social isolation from the remote northern Athapascans, and with a culture characteristic of the southwestern area. Again, we find the Tewa-

[1] 'Syst. d. Phil.,' 1, 389. It is interesting to note that in a chapter of his 'System der Philosophie' (2, 188–211) devoted to the evolution of the social mind ('Entwicklungsformen des Gesamtgeistes') Wundt treats exclusively of the forms of social organization beginning with the tribe and leading up to the modern state. Here he ignores all other possibilities of a broader aspect of cultural development, in spite of the fact that the 'Gesamtgeist,' by way of definition, pertains to the psychogenesis of culture at large.

[2] Wundt, in *Deutsche Rundschau*, 1891, 198.

speaking inhabitants of Hano living in the closest social and cultural relations with the Hopi, in spite of the difference of tongue. The Plains area shows a great diversity of speech associated with a great similarity of other cultural factors, especially of material culture. Anthropology furnishes numerous instances of the constant dissociation in the distribution of cultural elements.

Wundt's folk-psychology pretends to be based on empirical facts; but is it not rather an unhistorical construction, inspired by the *a priori* idea of the manifestation of the folk-soul in the organized social group? When I protest against the identification of the folk-soul with the organized group I do not mean to question, of course, the social factor in cultural development. That would be an absurdity. The point lies in another direction. The question is whether we can conceive the development of culture, language, religion, and custom in the form of a single line of psychogenesis, as implied in Wundt's idea of the 'Gesamtwille' and of the constructive development of the social group.

I emphasize the 'single line' of development, because Wundt's psychogenesis[1] represents psychic evolution as a *typical* and universally valid succession of developmental stages. He thus intentionally abstracts from the heterogeneity and multiplicity of the lines of development as they are presented to us empirically in the history of culture. Wundt's idea of psychogenesis is determined by his postulate of the purely psychological, non-historical nature of all folk-psychological problems. The fundamental question is whether such an abstraction from all concrete historical data is methodologically permissible. Quite apart from other theoretical considerations Wundt's method is condemned, in the eyes of the anthropologist, by the fact that, while positing the psychology of cultural development as the particular object of folk-psychology, it ignores completely an account of the inherent schematism of its unilinear construction, the two fundamental psychological problems of cultural development; namely, that of culture areas, and that of cultural diffusion. These two

[1] 'Elem. d. Völkerpsychol.,' 4.

complementary psychological problems transcend the realm of the unilinear psychogenesis of the organized group as such, and thus find no place within the dogmatically limited sphere of Wundt's would-be social will (*Gesamtwille*). What is the psychological significance of cultural specialization within certain geographical areas—a specialization quite distinct from the distribution of language, and in no way limited to social units? What is the psychological interpretation of the relation of cultural centers—those focal points that appear like the crests of waves—to the outlying fringes of the areas? What are the psychological situations that quicken the diffusion of borrowed cultural elements? What are those that retard or exclude the diffusion? What are the factors that determine on the one hand the passive absorption, on the other the active assimilation of borrowed traits? These are all real psychological problems. They apply specifically to those cultural phenomena which Wundt's folk-psychology seeks to comprehend—to such phenomena, for instance, as sound-shifts, the psychical transformation of religious ideas, and the heterogeny of custom. But Wundt's folk-psychology ignores such problems in favor of a construction which, while ingenious, blinds us by its very nature to the real psychological problems as presented by the empirical facts.

I have tried to demonstrate that Wundt derives his concept of the social will from the group as an organized social entity with collective modes of action. This derivation is characteristic of Wundt's attempt to arrive, through a process of conceptualization, at a purely psychological construct, to be operated with in a would-be science of over-individual syntheses. This construct is the folk-soul. Inasmuch as the problems of folk-psychology are to be purely psychological, the folk-soul must be conceived as a psychological actuality *abstracted* from the concrete historical phenomena. But where is this purely psychological something demonstrable, since all cultural developments are given as concrete historical phenomena? It is not difficult to understand why Wundt, in this dilemma, seizes upon the collective actions of the organized group as a tangible realization of the social will, and thus, in

his terminology, of the folk-soul. But one dilemma is not annulled by the addition of a new one. The construction of a typical and unilinear psychogenesis of language, religion, and custom is contradicted, as we have seen, by the culture-historical phenomena themselves, from which the folk-psychological construction is supposed to abstract. The net of contradictions in which Wundt thus becomes involved is caused, as will be shown, by his *a priori* assumption that in the study of cultural phenomena a separation of the psychological from the historical point of view is methodologically feasible.

VII. The "Typical" Nature of Folk-Psychological Inductions

Before entering on the discussion of this final point of our criticism, it is necessary to dwell for a moment on Wundt's proposition that the inductions of folk-psychology are of 'typical'[1] significance. This is a fundamental point for Wundt, inasmuch as it is a direct expression of the 'purely psychological' bearing of folk-psychology, and thus implies his idea of the absolute distinction between psychology on the one hand, and history on the other. According to Wundt, the phenomena of psychology are 'typical'; those of history, 'singular' (*singulär*).[2] Individual psychology deals with the psychical processes of individual consciousness, in so far as they are 'typical.'[3] The processes of folk-psychology as an essential branch of general psychology are characterized in the same way. "Gegenstand einer psychologischen Disziplin kann . . . überall nur das Allgemeingültige, Typische sein. . . ."[4] The concept of the 'typical' in folk-psychology is derived from the corresponding concept in individual psychology by means of Wundt's general analogy of the individual soul as the

[1] I use the term 'typical' to convey the meaning of Wundt's terms 'typisch' and 'allgemeingültig.'

[2] I would call attention to the specific sense in which I use the term 'singular' in order to make it correspond to Wundt's 'singulär.' It is the contrasting term of 'typical.'

[3] 'Logik,' 3, 162.

[4] 'Logik,' 3, 230.

microcosmos, and of the folk-soul as the macrocosmos. This analogy, with its derivative concepts, appears plausible enough as long as it remains in an ethereal sphere of abstractness. As soon as such ideas are elaborated for specific application, they become self-contradictory. That this is precisely what happens to the concept 'typical,' I shall attempt to demonstrate presently by means of certain inconsistencies in Wundt's considerations.

The subject-matter of folk-psychology, language, religion, and custom, is originally given in the form of 'singular' phenomena, and is thus subject priorily to a purely historical consideration. From these 'singular' data of history, however, the 'typical' material of folk-psychology is gained by means of analysis and comparison. The 'typical' something that is thus supposedly found is referred to by Wundt as the 'common attributes of the folk-mind' (*allgemeine Eigenschaften des Volksgeistes*).[1] Then, again, he speaks of the products of the refining-process as the 'universal laws of psychical evolution' (*universelle geistige Entwicklungsgesetze*).[2] In another connection, however, Wundt explicitly states that the general psychical laws that are borne out by folk-psychology are necessarily already completely contained in individual psychology. He says: "Darum ist es von vornherein ausgeschlossen, dass in der Völkerpsychologie irgendwelche allgemeine Gesetze des geistigen Geschehens zum Vorschein kommen, die nicht in den Gesetzen des individuellen Bewusstseins bereits vollständig erhalten sind."[3] By combining these two propositions of Wundt we arrive at the conclusion that the laws of folk-psychology, which are supposed to characterize the attributes of the folk-soul, are not at all characteristic of the folk-soul, inasmuch as they are but applications of individual psychology. The contradiction thus incurred demonstrates the meaninglessness, on the one hand, of the term 'typical' in folk-psychology and, on the other, of the juxtaposition of the individual-soul and the folk-soul.

[1] 'Probl. d. Völkerpsychol.,' 28.
[2] 'Probl. d. Völkerpsychol.,' 24; see also 'Logik,' 3, 240.
[3] 'Logik,' 3, 227.

There is another point of view from which the "typical" nature of Wundt's folk-psychology can be criticised. As we have seen, its 'typical' significance implies theoretically that the subject-matter of folk-psychology is 'purely psychological'; that is to say, non-historical. In order to ascertain what this 'typical,' non-historical something is, we naturally turn to Wundt's work on folk-psychology itself. What we find here differs strikingly from what the theoretical foundations have led us to anticipate. The three spheres of folk-psychological investigation are, according to Wundt, the purely psychological problems of language, religion, and custom.[1] Those of language and religion are dealt with in his large work on the subject; those of custom, in a part of his 'Ethik.' A glance at the contents suffices to show that in reality Wundt's folk-psychology, far from dealing with 'purely psychological' problems, consists of psychological interpretations of a hypothetical *historical* construction. The content is certainly not non-historical: it differs only from the usual conception of history, in that Wundt has replaced the empirical account of historical developments by an historical construction which he regards hypothetically as the general course of the development of all language, religion, and custom. The 'purely psychological' of Wundt's theoretical postulates reduces and transforms itself in the actualized product into a 'generalized historical.' Thus the unscientific character of the 'typical' attributes of the folk-soul is proved by the very process of their elaboration.

The point just made is borne out still more clearly in the case of Wundt's latest work on folk-psychology, his 'Elemente der Völkerpsychologie.' Here we have before us a constructive history of human culture embracing the past, present, and the future—a brilliantly worked out scheme of the development of mankind through a number of successive cultural stages. This historical framework is constructed mosaic-fashion by fitting the traits of different cultures together, and by letting the presumably higher forms succeed the presumably lower ones. The selection of traits necessary

[1] 'Völkerpsychol.' (1st ed.), I, I, 24.

for building up in this way a ladder of evolutionary stages characterizes the ensuing edifice as purely hypothetical. What objective criteria, indeed, have we for determining one culture as 'higher' than another—for placing the Australian totemism, for instance, on a higher level than the types of 'primitive man' which Wundt adduces? From the empirical point of view, cultures are not differentiated quantitatively by varying degrees of development, but rather by the qualitative heterogeneity of their psychic specialization. The idea of 'degrees' of evolution can only be determined by an extraneous code of evaluation. In Wundt's case this code is clearly supplied by his purely ethical norm of the development towards a humanitarian ideal ('Entwicklung zur Humanität'), as elaborated in his 'Ethik.' In his 'Elemente,' this normative conception is, as already discernible from the table of contents, responsible for the arrangement of the empirical data of culture-history in a preconceived order of hypothetical stages.

Wundt's 'Elemente der Völkerpsychologie,' we repeat, is an historical construction. That Wundt himself conceives this work as historical is demonstrated by its sub-title, 'Grundlinien einer psychologischen Entwicklungsgeschichte der Menschheit.' But, according to the explicit theoretical foundations, the *raison d'être* of folk-psychology rests on the purely psychological, non-historical nature of its problems. Now an historical subject-matter evidently does not become purely psychological and non-historical, nor does it become 'typical' in Wundt's sense by forcing it into the mould of an hypothetical construction. It is generalized history, and Wundt has in the sub-title named the child by its right name; but by doing that his theoretical foundations of folk-psychology negate themselves. The 'Elemente' prove to be the *reductio ad absurdum* of the science of the folk-soul.

VIII. Psychology and History

The incompatibility of the theoretical foundations of folk-psychology and their actualization—the gap, in short, between the word and the deed—centers about Wundt's failure to apperceive clearly one fundamental problem. This problem,

as I conceive it, is that of the relation of history to psychology. We have already discussed his notion of the 'singular'-historical and the 'typical'-folkpsychological. Wundt does not always give the same connotations to these concepts. One mode of using them has been discussed above. Let us for a moment dwell on a variant form.

Wundt's large work on folk-psychology deals exclusively with what is commonly known as primitive culture, in contradistinction to the culture of documentary history. Wundt motivates the limitation of the scope of his investigations by stating that the early development alone of language, religion, and custom exhibit a *typical* psychogenesis, not yet vitiated by the conscious actions of individuals. These early stages of development are, according to Wundt, common to all peoples, because they are determined by universal psychological motives.[1] In the later stages single individuals become in an increasing degree the determining factors;[2] then the phenomena are no longer 'typical,' they are 'singular.' The typical phenomena of the early stages present psychological problems, and are therefore the domain of folk-psychology. The phenomena of the later stages, due to their 'singularity,' are non-psychological, and thus pertain to history. Wundt expresses this idea by saying that the field of history begins where that of folk-psychology ends;[3] but in his later work, the 'Elemente,' Wundt tacitly ignores altogether this distinction between the earlier and later stages of culture. In his 'Elemente,' as we have seen, he presents a construction of the whole cultural development of mankind, barring the above-said limitation. In fact, the fourth and last stage in this book, called 'die Entwicklung zur Humanität,' is conceived by Wundt as a period which we have by no means completed at the present day.

The distinction Wundt makes in his large work between psychology and history is of dubious scientific value, and is refuted by the contents of his later work. The notion that history applies to phenomena of individual making, in contra-

[1] 'Probl. d. Völkerpsychol.,' 22.

[2] 'Ethik,' 3d ed., 2, 364.

[3] 'Völkerpsychol.' (1st ed.), 1, 1, 25.

distinction to the psychological creations of the folk-soul, is arbitrary and implies a superficial conceptualization of history. The historical phenomena of conscious individual origin are in no way *essentially* distinct from the development of language, religion, and custom. Both groups of phenomena are historical, and both presuppose the psychological setting of culture. This bears directly on the criticism I made on a previous page of Wundt's theory on the relation of the individual to the group. The difference between the individual creations and the phenomena of language, religion, custom is not given objectively in the objects themselves, as would have to be the case if 'history began where folk-psychology ended'; but the difference is rather determined by the angle from which we ourselves view the objects. Let us take an example. Wundt states that the history of literature is the successor of the psychology of language.[1] The former deals with the historical creations of individuals; the latter, with the psychological genesis of the folk-soul. This distinction is plainly unmethodological, because Wundt contrasts and brings into an identical line of development two fields of research that are not comparable on account of the different subjective points of view adopted by the scholar, in spite of the common historical nature of the empirical objects. The psychology of language does not *develop into* the history of literature, as Wundt would have it. It is rather the focus of our interests that shifts.

A similar confusion of the relation of psychology to history is demonstrated by the way in which Wundt delineates the difference between ethnology and folk-psychology. In the relation of these two sciences Wundt rescues the 'purely psychological' (!) nature of folk-psychology by defining ethnology as a genealogy of peoples. Its problems are not psychological. Wundt says, "Die Ethnologie ist eine Wissenschaft von der Entstehung der Völker, ihren Eigenschaften und ihrer Verbreitung über die Erde. . . . Hier können scheinbar kleine Kunsterzeugnisse und ihre Abänderungen in hohem Grade bedeutsam sein für die Feststellung einstiger Wanderungen, Mischungen oder Uebertragungen."[2] These migrations, mix-

[1] 'Völkerpsychol.' (1st ed.), 1, 1, 25.
[2] 'Elem. d. Völkerpsychol.,' 5.

tures, and borrowings associated with the repression of psychology savor suspiciously of Graebnerian diffusionism, which this ethnologist has thought well to formulate as 'the method of ethnology.' It seems probable that this 'Kulturkreislehre' has been fatal to Wundt's conception of ethnology.

Enough has been said, I think, to show that Wundt has failed to bring psychology and history into an harmonious relation with each other. This is proved by the mutual contradictions of the theoretical foundations of folk-psychology, as well as by the gap between these foundations and their actualization. Graebner pretends to solve the problem of the relation of psychology to history by ignoring it. For him psychology does not exist, and history is something that serves as a bait for his 'Kulturkreislehre.' Wundt sees the reality of the problem, and answers it by drawing a sharp line between history and psychology. With this distinction the *raison d'être* of folk-psychology stands and falls. The impossibility of this distinction leads to the self-negation of folk-psychology in Wundt's 'Elemente.'

A criticism of Wundt's folk-psychology and of its theoretical foundations has a deeper bearing than the mere fact of pointing out logical discrepancies. The significant fact is that in the case of Wundt's folk-psychology a most ingenious attempt to mark out clearly a distinction between psychology and history has failed. Wundt has devised a remarkable foundation of concepts upon which to build up a new science of the folk-soul. His concepts of the higher synthesis, the social mind, the reality of folk-psychological actuality, etc., are all seemingly firmly anchored in a monumental philosophical system; but Wundt's conceptual scheme breaks down when applied. His failure is significant, since it proves the inconsistency of drawing a line between history and psychology. That history without psychology is an impossibility is proved by Graebner; that a non-historical psychology of culture, a folk-psychology, is likewise a misconception is proved by Wundt. It would seem to me that history, when taken in its broad sense as the history of culture, is intrinsically associated with a psychological point of view. The relation of psychology to history

is much the same as that of physics to physiology. Historical phenomena are interpreted psychologically as physiological processes are interpreted in terms of physics. The general scepticism that this form of the relation of psychology to history encounters is due, I believe, to two causes; firstly, to the disreputable rôle that popular psychology has played; and, secondly, to the unaccustomed novelty of thinking of history in its broadest possible sense as the history of culture (*Kulturgeschichte*).

What an intrinsic association of psychology and history can attain is well exemplified by numerous individual passages in Wundt's works on folk-psychology, when we abstract from all his theoretical foundations. There we find psychological interpretations of historical phenomena executed with a brilliancy characteristic of Wundt's genius. Such interpretations of Wundt will mark the monumental significance of his work long after folk-psychology as such will have been recognized as an 'Unding.'

ATTITUDE AS IT AFFECTS PERFORMANCE OF TESTS

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The aim of mental testing for ability is certainly the ascertainment of the individual's potential; it properly is nothing else, and if there are factors which interfere with such ascertainment they must be recognized and allowed for. Experience has taught us the great importance of one factor—we have learned that performance of psychological tests is vastly influenced by mental attitude.

Insofar as mental attitude has been discussed at all in psychological literature it has been treated mainly as a factor in the learning process. In his 'Educational Psychology' Thorndike has enumerated the law of attitude as one of the five subsidiary laws of learning. He says: "It is a general law of behavior that the response to any external situation is dependent upon the condition of the man as well as upon the nature of the situation." And again: "Only a little less obvious should be the fact that the attitude or set of the person decides not only what he will do and think, but also what he will be satisfied and annoyed by." In another chapter he states that, "Purposive behavior is the most important case of the influence of attitude."

Ruger, Book, and Swift, in their experiments on the learning process, give the introspective accounts of various subjects as to the influence of attitude. Ruger states that the attitude of confidence was a great aid in the successful solving of puzzles; Book speaks of the influence of a favorable "feeling-tone"; and Swift mentions the ill effects of a feeling of discouragement on the part of the learner. Aside from these general discussions little has been written on the subject.

Just as in the learning process, so in the performance of tests for ability the influence of attitude is all potent. The

mental set with which a person approaches a task is a large factor in success or failure. Mental attitude has very wide bearings; it is present at all times and influences all behavior, but in no realm is it more important than in the performance of psychological tests.

Though most observers recognize in a general way the importance of this problem, no experimental effort has ever been made, so far as the writer knows, to measure just how strong a force attitude is; nor would it be an easy task. To study it by introspective means would be possible only with skilled subjects, and to deal with the problem objectively would be possible only by creating very artificial situations whose influence even then might not be the same with any two individuals. In group or class experiments it is almost impossible to gain an insight into the attitude of the various members. It is only when individuals are being tested singly that opportunity arises to study this question.

And yet, although so little has been done, the problem is an exceedingly important one. Today, when so many practical issues are met on the basis of the diagnosis of the individual's mentality, when schools and courts are dealing with children and adults according to the findings of the psychological laboratory, all related problems become vital. Sometimes it would seem as if the examiner is content to determine the subject's ability without regard to any and all kinds of hampering conditions. But when we consider that the entire future care and education of an individual may depend on the verdict of the examiner, we realize the importance of weighing each reaction in the light of all the conditioning factors.

In our work in connection with the court we have unusual opportunities for studying the problem of attitude and for evaluation of it as a factor. It is true this can be done only in descriptive, not in quantitative terms; but because the situations are so real the proof becomes very clear and therefore valuable. We have situations of real life, complex as those really are, and yet controlled in a measure as they may be in any laboratory.

From observations of these living conditions we know that

attitude affects practically everything, and in turn it is affected by well-nigh everything. All external features of a situation influence it. Thus the psychological laboratory must be a quiet room, free from distraction, with good light and ventilation. Then there is the more subtle influence of the personality of the examiner, whose peculiarities and mannerisms are factors more often than we realize. One need only mention the influence due to the presence of onlookers at the time of examination to realize the serious consequences on the attitude of the examinee and the frequent vitiation of test results caused thereby.

The time and place of examination too are matters of vital importance; in work such as ours, where the psychological laboratory is a department of the court, this is especially true. To examine a person at the court, either immediately before or after his appearance before the judge, is the greatest folly, for the results are often unreliable because of the disturbed mental condition. Equally as foolish is the examination soon after an order of commitment to an institution has been made. In these cases there are injected into the situation elements that may affect the results to such an extent that the picture presented is utterly false.

Further, there must be sufficient time for each examination to permit of a natural introduction to the test. There must be some opportunity for presenting a motive for exerting one's best efforts. Dewey has shown that motive is always a large factor in successful achievement; this applies equally in the performance of tests. Not infrequently we are asked the purpose of the testing and we know, in the light of our experience, that the giving of a motive that seems rational means coöperation on the part of the subject.

Sometimes the difficulty is just the reverse. Before the individual comes to us he has been given an explanation by others which leads to an unfavorable attitude. For example, some one has told him that the purpose of the testing is to determine whether or not he is insane or feeble-minded. In such cases, where there is apprehension because of this, the attitude must somehow be changed before beginning the examination if we are to reach conclusions that are valid.

Our practical procedure endeavors to meet these conditions: The young person has committed an offense; the circumstances are to be investigated and he is to be judged, but he meets us as friends who are anxious to understand and help him. We do not study our cases at court, but while the offenders are in the Detention Home. We can thus wait until they have become accustomed to their new environment, until their first emotions have been mitigated. We have sufficient time for each examination to enable us to make any approach we feel is advisable in the given case, even if it necessitates first becoming friends in the playroom. Because the young person is made to realize that the outcome of his work will be a factor in determining his future career, he has a genuine motive for coöperating and doing his best. We are able to see him again and again, under varying conditions, and to note the differences in responses when these can be due only to difference in attitude. No other element in the situation is altered and hence no other can be offered in explanation of the change. Just because of the complex nature of the situation it is possible for many different attitudes to be observed.

Of course there are frequently instances where retesting does not alter the results, where the first results represent the best the individual is capable of doing. This should confirm our general thesis, since it shows that when failures are due to lack of innate ability the failures are repeated. When on retrial the individual succeeds where he at first failed, there must be some other explanation.

Thus in the case of a boy of seventeen (Case I), the first examination gave such peculiar results that one felt the explanation must be that the lad was displaying a peculiar attitude, probably incriminatory depression. No recalcitrancy was evident, but the boy's mind seemed to refuse to work. He succeeded with things that could be done automatically, but where any real thought was required peculiar inhibitions appeared. He seemed much depressed and exceedingly nervous; while endeavoring to coöperate he would stop work and sit as if pondering about something. Results on tests were very variable and showed numerous peculiarities. Since this

was the boy's first offense we felt that perhaps because of fear and anxiety he was unable to do himself justice, and that it would be only fair to retest him at another time. Less than a month later, after the boy had been released to his parents, was living at home, and could not possibly be fearful of the outcome of his case, he was retested. The results were very much the same as at the first examination. Up to the present time this boy has been seen on three different occasions. We have studied him very carefully and have been unable to find any marked change in his reactions. We have come to the conclusion that the boy is suffering from a psychosis and that the peculiarities in his behavior, when originally seen, were not due to attitude as we had suspected. But before reaching our final conclusions the boy was given every possible chance of doing the best of which he was capable.

We would also emphasize the point that the situation is quite different where the examination deals with adults or older adolescents. Our work, though mainly confined to younger adolescents, has given us ample opportunity of proving this. A young person is more naïve, less self-conscious; the older person, on the contrary, is often embarrassed, self-conscious, and afraid that he cannot do this or that well. He feels either that the tests are insultingly simple, or that they are only apparently so, while in reality meant to "catch him." If he adopts the first point of view he does not coöperate well, and if he takes the latter view he is over-cautious. We have noted frequently that when adults, sent us by our pension department, are being tested they are ill at ease; they frequently state that they feel ashamed that they have forgotten many things which they once knew. The tests are novel to them and there is great difficulty in getting them to adjust themselves to this new situation.

Particularly is it difficult to introduce Binet tests in any natural or interesting way. We frequently hear well-educated people state that they too would fail on such tests; and perhaps they would, simply through fear that their natural response would be too simple to be correct. Doubtless, this is largely the explanation of the peculiar and interesting results on the

Healy pictorial completion test where the younger people whom we see are compared with students at Wellesley College. The fact that these college students did not do as well as our normal but not nearly so well educated group, is no doubt due to the difference in attitude.

As one would expect, it is the emotional aspects that are most frequently disturbing elements. Shand, in his book called 'The Foundations of Character,' emphasizes the important rôle which the emotions play in conduct. Thorndike comments upon the influence of emotions, but in relation to the improvement of any function. What he says, however, holds good in the problem of performance in general. He states it as his belief that the absence of irrelevant emotional excitement and the absence of worry are two conditions conducive to improvement. He believes that all emotional excitement is distracting and is a waste of energy and a preventive of good results.

Certainly, in the performance of tests the emotions often enter in and affect results markedly. We propose to show by means of illustrative cases a number of instances where this is true. Fear, anger, general depression, humiliation, embarrassment, timidity—these and numerous others can be shown to be factors of great consequence.

We here merely mention, in passing, the fact that some physical conditions interfere with performance. We shall not go into detail nor illustrate the peculiar results due to the mental state of the epileptic and hysterical, the reactions of psychoses, major and minor, the mental disturbance of chorea and the effects of bad physical conditions and debilitating habits. No one should doubt the influence of all these upon mental states and thus on responses to tests.

We turn now to illustrative cases representing examples of various types of attitude that we have observed in our work:

I. *Deliberate Deception.*—It is easily conceivable that a person may, from various motives, fail to achieve success willfully and intentionally. He may do so as a matter of resentment or indifference, or because he thinks it to his

advantage. He may believe that if considered incompetent he will be excused from work which he dislikes, or be dismissed from a school or institution where he does not wish to remain. Again, he may have some other reason, distorted perhaps, but logical to him. The first case presented illustrates this last point.

Case II.—A boy, 10 years 3 months, was brought for examination. It was a disciplinary problem, the parents not being able to control the lad. He had been a great truant previously, and in consequence had been sent away from home to a school for truants where he had remained for some months.

He graded 6⅞ years by the Binet tests,[1] failing on all the 8- and 9-year groups. He failed on the simple test for mental analysis, namely, the crossline test,[2] said $8 + 4 = 13$; $4 + 6 + 5 = 16$; altogether a very stupid performance. Asked to read a passage beginning, "It was autumn, the leaves were falling and the cold winds had begun to blow," he said, "It was autumn, the leaves were *not* falling and the cold winds had *not* begun to blow," etc.

The boy was plainly told that if he could do no better he would have to be sent away to a school for stupid children and that perhaps he was so bad because he was so dull. His face expressed the greatest amazement and he immediately said he could do better. On retesting him, he not only passed all the 8- and 9-year Binet tests correctly, but all the 10-year tests as well. He added, subtracted, and multiplied fairly difficult problems without error and proved capable of solving a number of performance tests. Asked later to explain his queer behavior, the boy gave the following facts: Before being sent to the school for truants he had been examined at another clinic; he had done his best and had been sent away. Now, remembering his past experience and not wishing to be sent away, he thought that by doing poorly he would escape his

[1] Throughout this article Binet tests refer to the last revision by Binet himself, namely, the 1911 series.

[2] See Healy and Fernald, 'Tests for Practical Mental Classification,' PSYCHOLOGICAL MONOGRAPHS, No. 54, March, 1911.

former fate and determined to fail. Good logic, as one sees, if only his premise had been correct.

In this case the willful deception, so easily understood when explained, might not have been discovered if no attempt at analysis had been made. If the examination had been made hurriedly and the examiner had been content with the objective first findings, an egregiously false judgment might have been formed. Incidentally, this case illustrates too the value of obtaining former history to corroborate a diagnosis.

Case III.—A very similar situation is presented in the case of a little girl 12 years and 4 months, reported by the school authorities, by the mother, and by a probation officer as being "exceedingly incorrigible." The principal of the school brought the girl to us because he thought she must be mentally defective; indeed, she had already been placed in the subnormal room. She was said to be exceedingly willful, obstinate, and bad tempered; she was besides a great truant.

When we first studied the case we found this little girl graded $9\frac{3}{6}$ years by Binet tests and succeeded with just about third-grade school work. Thus she was apparently sufficiently retarded to come within the group of those denominated as feeble-minded. Because of her general bad behavior this girl was sent to an institution for semi-delinquents. There it was reported that she was feeble-minded, that she could not do any school work, nor was she educable. Wondering if the girl had done much worse on testing than she might have except for her unfortunate attitude, we retested her just three months after the first examination. We found that she passed all 10- and 12-year Binet tests readily, and that she did a number of other tests quite well for a girl of her age, grading thus slightly higher mentally than her chronological age. At this time she confessed that when first seen she had purposely done poorly, thinking that she would then not be held accountable for her bad behavior; that she had pretended to be exceedingly stupid hoping that they would refuse to keep her there. Now the discipline of being sent away from home, which was very distasteful to her, had proven so effective that she was most anxious to do her best. Later reports have shown that this

girl is quite capable. She has been returned to the public school and all reports have been satisfactory.

Case IV.—The next case of purposive failure presents an instance where the boy thought that by proving himself inefficient he would be dismissed from the institution to which he had been sent. He had been told by other boys that he would be kept there indefinitely if he had a good record, but that bad and stupid boys were allowed to return home. Examined there, the verdict had been that this boy of 15 was mentally a high-grade moron, 10⅝ years by Binet, that he was erratic, his memory power and judgment defective. On the strength of this diagnosis was incurred all the expense and trouble of sending him to the city as a candidate for the school for the feeble-minded.

When we first saw the boy he was anything but friendly, but he passed, nevertheless, all the Binet tests up through the 12-year group, except one of the latter. He did construction tests fairly well but failed on the second crossline test even after four trials. Nothing further was attempted in the way of tests that day, but an effort was made to gain the boy's interest and good will. Retested the next day, when his attitude was much better, he succeeded on the failed 12-year Binet test, and passed four of the 15-year tests, was correct on the crossline, first trial, did some fairly difficult work in fractions, and learned a new process in multiplication of fractions. Repetition of this later proved that the boy had grasped the principle involved and that he was quite capable of further education. He frankly said to us this day that when tested at the institution he had "stalled," and explained the motive for his behavior as given above.

II. *Recalcitrancy.*—Often, however, it is a matter of recalcitrancy rather than purposive deception which explains the mental attitude of the subject. One example will suffice to depict a typical case, though this might be duplicated indefinitely if there were need. The point can be so readily seen that repetition of cases is unnecessary.

Case V.—Immediately after seeing this boy for the first time, the examiner dictated the following impression: "He turns

his head away, jerks his shoulders, says, 'I can't do it,' 'I don't know.' He is stubborn, yet clever in shirking work. Thus he said that he did not know the difference between various objects; that he only knew their Polish names. (He later did splendidly on this test.) He succeeded on numerous of the tests only after both cajolery and scolding were tried. Furthermore, the teacher in whose class he is says of him: 'He is a bad boy. He hits others and then is vociferous in his denial of having done anything wrong. He is a typical bad boy.' The officer says, 'He is as shrewd as a little fox.'"

We note that the home conditions might well account for a part of this boy's clearly shown tendencies, for the father is reputed to be 'a brute, immoral, many times arrested.' The mother is in the last stages of consumption and exerts little control over the children.

Had this boy been judged by the actual results of his first tests he would have been considered feeble-minded. Realizing that these did not present a true picture of innate ability an effort was made to change the boy's attitude, with sufficient success to cause a vast amount of improvement in the final outcome on the second testing. Thus after the first morning's work he graded 8 years by Binet; three days later this was raised to $9\frac{3}{6}$ years. He failed on the simple crossline test on the first day's efforts, later doing this correctly at once. When first seen he was unable to do—or claimed he was unable to do—the simplest addition, such as 2 + 2, whereas finally he did ordinarily difficult problems in addition and subtraction. His record on construction tests improved vastly, but of course part of this may have been due to practice effect. However, it is clear that the tests which originally had to be scored as failures were successfully solved when the boy was actually coöperating.

No motives for this boy's earlier reactions were ever discovered; they seemed to be typical of his generally recalcitrant behavior.

III. *Sportiveness.*—There are persons who are not inclined to be serious about anything; they accept all life somewhat as a

joke and their 'devil-may-care' attitude may often be one of the causes of their delinquency. They may show this same attitude towards testing; indeed, in the example cited below, the boy acknowledged that when first tested at the correctional institution he had made no effort to succeed, but rather had quite enjoyed the fact that his simulation of disability had been accepted seriously by the examiner. His attitude, according to his own words, was "I put it over on the doctor." That the outcome might seriously affect his whole future had not occurred to him, nor had any one made this plain to him; the testing was just another opportunity for fun. He did not interpret the situation as anything of serious import.

Case VI.—This boy, 16 years 8 months, was quite troublesome at the institution, and since the result of the examination there gave an opportunity for transferring him to the state school for the feeble-minded, it was desired to have the court order this done. Thus we were asked to study the case.

The report sent with him was that he was a middle-grade moron, $10\frac{8}{9}$ years of age mentally. The superintendent, among other facts, stated that the boy was noted for his attitude of indifference.

With us he at once inquired why he was asked to 'do these things.' He wished to know if we were determining if he was 'crazy.' We explained that there was no question as to his sanity, introducing the tests on a vocational basis and trying to make him realize the vital importance of doing his best.

He proved conclusively that he was quite normal in ability, for he succeeded easily on all the 12-year and three of the 15-year Binet tests; did both construction and both crossline tests well; showed good apperceptive ability—in fact did quite well on a wide range of tests, the only exception being on formal school work; this was due partly to his earlier truancy, partly to early bad environmental conditions, and possibly somewhat to his general attitude. The boy himself acknowledged that his efforts with us had been more serious; he said with quite a little glee, for example, that previously, while the examiner was looking out of the window, he had mixed up the Binet weights. Certainly we proved that this lad could not be

regarded as mentally defective and the earlier recommendation, namely, that 'if some guardian will not be responsible for him he should be sent to an institution for the feeble-minded,' was one with which we could not agree.

IV. *Emotional Disturbances.*—Any one of a number of causes may lead to such emotional disturbance on the part of the examinee as will affect the test work greatly. We can readily appreciate, on the basis of personal experience, that emotional distress may cause great lack of self-control and inability to center attention on the task in hand. It may cause one to adopt an attitude decidedly disadvantageous for the performance of any kind of mental work.

Proceeding from our experience with results on tests quite different from what they otherwise might have been, we subdivide the causes according to the emotional conditions conducing them. They appear as follows:

(*a*) *General Depression: Case VII.*—In the first case cited, the examiner, immediately after testing the boy, dictated the following: "This boy's manner throughout the tests was peculiar. He seemed not so much nervous as distraught; for long periods of time, perhaps as much as a minute or two, he sat doing nothing. There were other long time reactions in a number of the tests. In spite of the fact that the Binet tests were well done, except for some peculiarities, and all school work was satisfactorily accomplished, the results on many other tests were decidedly poor. The impression made is that the boy is not incapable so much as extraordinarily peculiar."

When the results on tests during this first interview are noted in detail, the decided peculiarities of this big, strong boy of 15 years 6 months are seen at once. He tells us that he has reached the seventh grade. The simpler construction test, readily performed by younger children, he fails to accomplish in 5 minutes. During all this time the boy made but 13 moves, the first 3 of which were done in 3′. The more difficult construction test is a failure at the end of 10′, during which time only 13 moves had been made. Although he succeeds with the simpler crossline test on the first trial, he

fails on the second one after four trials. The pictorial completion test is completed in 8′ 48″ with 7 errors, 3 of which are illogical. The easy opposites test shows an exceedingly irregular time reaction, the range being 1.4″ to 9.2″, the average time 3.5″; three reactions are scored as failures because of being given after 10″ had elapsed. In the Kraepelin test, where the numeral 7 is continuously subtracted from 100, several steps are done very rapidly; then a long pause occurs, but the whole is completed in 1′ 41″ with only 1 error. Taken by themselves the results give a picture of reactions which might lead one to believe the boy to be the victim of a psychosis.

Later, in conversation with this boy, it was found that as soon as his story was approached he became much frightened; beads of perspiration stood out on his forehead, and big and strong as he was he began to cry. In the course of his story it was discovered that this was the boy's first arrest and he acknowledged that he was exceedingly unhappy; that he was continually thinking of his mother and that he was unable to keep his mind on what was being asked of him.

Several days later, after the family had visited him and there had been a discussion during which it was virtually promised that the boy would be allowed to go home on probation, he was asked to try again a few of the tests. He now did the first construction test in 16″ with 6 moves; the second construction test was performed in 40″ and 11 moves, an extremely good record. The second crossline test was correct on the first trial. The completion test was performed in 1′ 30″ with only 1 illogical error. The opposites test was accomplished without error or failure and with quick and even time reaction.

Nothing could be clearer than the fact that this boy originally was laboring under such mental disturbance as to make it utterly impossible to test him fairly under the circumstances. Just such states of mind, no doubt, frequently occur, but the examiner does not always take the trouble to learn just wherein the difficulty lies. Or he may not have considered the matter enough to be conscious of the important rôle it plays.

To illustrate that even such an apparently small matter

as the propinquity of a relative may serve to spoil a performance, we present briefly the next case:

Case VIII.—A boy was brought to the laboratory for testing; unfortunately on the way he discovered that his mother was in the building. When he began his work it was seen that the time was not propitious, for his emotional disturbance was quite apparent. He failed on the first construction test and performed the completion test with 4 errors. Of course, there was nothing to do in this case but to defer the examination until another time. Comparing the results of the two tests mentioned above with the results attained later, we find that the construction test was correctly solved in 2′ 30″, and the completion test performed with but 1 error when the boy was seen under more favorable circumstances.

Case IX.—A third case is cited because so much time was given it and because the verdict was exceedingly important. A boy of 16 was studied at a reformatory institution where it was recommended he be transferred to the institution for the feeble-minded. The report of this examination was that the boy's mental age was 10½ years; that he was indifferent, mentally suffering from delusions grafted on feeble-mindedness. Before this transfer was made the boy was sent to us for further study.

We found him greatly depressed. Not only that, but the boy himself had a distinct grudge-attitude. He felt that he had not been justly treated in being sent away, and indeed, when all the circumstances were known one was of the opinion that the boy was a victim of many bad circumstances rather than altogether the culprit. He came from a miserable home. The mother was immoral and at the time was serving a sentence in a correctional institution. All the circumstances regarding this were known by the boy and he was very unhappy about the whole matter. During his stay at the institution to whch he had been sent he was discontented; had run away once and been sent back.

A great effort was made to have the boy feel at home with us and to realize that we wished to be of assistance to him. Although he never became extremely friendly yet he changed

his attitude sufficiently to make a greater effort in the direction of tests when it was made plain to him how largely his future welfare depended upon the outcome of his work. We found that he was able to pass all the 12-year Binet tests and three of the 15-year tests. He made an extremely good record on our construction tests, succeeded on both the crosslines with one trial, showed quick and normal apperceptions on the completion test; in fact, the results were uniformly good, except on tests which required good powers of concentration and mental control, such as the opposites and the Kraepelin. In consequence we were led to believe that the boy had not done himself justice when tested at the reform school, very largely because of his general depression and his unwillingness to coöperate as well as he might have. His so-called delusions were really well-founded feelings concerning his inability to make good when he should be sent back to his old environmental conditions.

Of course there are instances of depression verging on despondency or melancholy. Illustrations, however, would lead us into the field of the psychoses, which we are not discussing here. We must recognize clearly, however, the fact that even in cases of depression, such as we see, there is often almost a typical paralysis of thought. The repugnance for mental effort, so characteristic in melancholics, is evident, though in lesser degree, in cases where the individual is unhappy or extremely anxious.

(*b*) *Anger or Resentfulness.*—This may exhibit itself in two different phases; it may be an attitude or feeling entertained towards some other person, or it may be anger at the world in general, oneself included.

Case X.—The first type is illustrated in the case of a girl of fourteen whom we were asked to see. We have only a single record on tests but one is confident that the results are unfair, not because we have proof of this by later testing, as in the cases cited above, but because the general attitude of the subject was so perfectly apparent. When brought to the laboratory she at first refused to do anything; maintained that there was no need to do anything for her; she wished to be

sent to a reformatory. She showed at once that she was self-willed and moody. When on one or two tests she became interested it was as if this were against her own will. She was indifferent to commendation, uncommunicative, and showed the same characteristics toward several people who tried to convince her that they wished to be her friends. The notable point may be added that, as frequently occurs, the girl did performance tests when she absolutely refused to attempt any other kinds. Often the examinee will coöperate on tests with concrete material when he fails on anything in which he has either to speak or to deal with abstractions.

The construction tests were fairly well performed in spite of her indifference, but her failure to succeed on the second crossline test, even with four trials, was undoubtedly due to her attitude and not to her incapacity. She refused to attempt several of the tests; on the testimony experiment she gave but three details and said she had seen nothing more in the picture. It can readily be seen how well-nigh hopeless it is to make any diagnosis of such a case when but one interview is possible. If one accepted the girl's statement, "I can't do it," as being literally true, rather than as indicating "I won't do it," one would certainly do the girl a great injustice, for from her general conversation it was apparent that this girl was at least normal in ability. She was, however, furiously angry at the probation officer for bringing her into court, and in consequence would coöperate with no one.

Case XI.—The extreme instance of this type of behavior is seen in the case of a girl of 16, who talked very well and was said by the teacher in the school-room to do seventh-grade work well and easily. When brought to the laboratory this girl steadily refused to do any tests. It was reported by her mother that often she exhibited great obstinancy, had a very bad temper, and that she was very loath to exert herself in anything. The whole case is summed up in the girl's own words: "I am not weak; I just do as I want to. I don't intend to do any puzzles for you because Mrs. A. (an attendant at the Home) said, when she was mad, that she was glad I was going to have my brain examined. I'll not do any more work

for you; if you make me, I'll do it all wrong." We have often noticed a similar attitude of resentment evinced by those whom we are asked to see after they have been committed by the court to some institution. This has been borne in upon us so strongly that we have reached the conclusion that it is unfair to see cases just after the court decision has been made. One case will suffice to illustrate this type of reaction.

Case XII.—The first tests were given before this girl went to court, with results that were uniformly good. Because a report was made by the officer that the girl was considered very dull we later asked her to do for us a few more tests, including the Binet. We found her attitude entirely changed. Although she gave answers to questions asked her, we found her resentful, unresponsive, indifferent, and sulky. During the testing, at various intervals, she herself said it was all foolishness. She was going to be sent away and she didn't see why she should do these puzzles anyhow. In consequence the Binet tests, where there was 1 failure in the 9-year, 4 failures in the 10-year, and all failures in the 12-year series, gave us a picture that was certainly not fair.

Case XIII.—The second type of anger is seen in the case of a boy not yet 13 years old. This lad is not normal in self-control. He has spells of excessive anger when he seems more furious with himself than with anyone else. He himself says, "Everything makes me mad." This general attitude is as clearly evidenced by his reactions during the test period as in his general behavior. He begins in a friendly, acquiescent manner, but as soon as his efforts meet with poor success his expression changes to one of intense moroseness and he refuses to make any further response.

He grades as normal in ability, passing all Binet tests through the twelve-year series except one of the last group. After having some slight difficulty in the solving of a test in which he finally succeeds, he becomes so provoked that he fails altogether on the succeeding tests, namely, the more complex construction and the more difficult crossline test. Results continue to become worse and worse. He shows extremely poor apperceptive ability, making illogical errors

in seven of the ten spaces on the pictorial completion test. After a miserable failure on the Kraepelin continuous subtraction test he refuses to try again and then begins to cry.

Seen a few days later he begins very well. He solves correctly, on the first trial, the construction and crossline tests, previously failures, but after making another poor attempt on the apperception test he once more grows angry and will not exert himself further.

This boy's behavior in his own home is in entire consonance with his behavior in the laboratory. He is given to spells of uncontrolled and violent anger. These reactions must be taken into account in forming an estimate of the boy's abilities as well as of his characteristics. There is no doubt that he could achieve success if he could but control himself sufficiently to rationally continue his efforts.

(*c*) *Fear.*—It can readily be seen that many a subject, either not realizing the exact purport of what is being done, or fearful of the action that will be taken as the outcome thereof, will be frightened at what is before him. This may act as an inhibitory force during tests. Realizing this fact we make every effort to prevent the child's being apprehensive, trying to encourage him and make him feel at home. In some instances we simply make no attempt to do any psychological testing at the first interview. Were it not that we are ever watchful of such conditions, no doubt we would find many more such subjects than we do.

Case XIV.—Recently a small boy of 12 was in court for the first time, charged with stealing. It was apparent to everyone that the lad was much afraid. His pupils were dilated and he stammered excessively. Asked his age, he first said 11, then 13, though his mother stated that he was in reality 12, and the boy himself so told us later. When the judge endeavored to speak to him he kept repeating, "Mr. Judge, I didn't do it, I didn't do it," alternating this with, "I am afraid somebody is going to kill me."

As a matter of interest and for scientific purposes, this boy was tested immediately after he left the court room. No effort was made to change his emotional state (but as is always

done he was urged to do his best). He was tested in just the frame of mind in which we found him—his pupils were still dilated but he did not stammer. He was not at all recalcitrant; indeed, he made a decided effort to do what was asked of him. Such tests were tried as could be repeated without the results being improved through practice. It was found that what could be done on the basis of rote memory was done quite well, but where processes of thought or mental representation were required the results were exceedingly poor. The simple crossline test was a failure after four trials; the more difficult one was quite beyond him. Tested for memory span he repeated six numerals correctly, failing on the seven-place numeral test. Asked if he had one dollar and spent 87 cents how much would be left, he repeated over and over, "30 cents."

On Binet tests he graded through 9 years. He failed to give the difference between remembered objects, to define simple as well as abstract terms, to detect incongruities, and to answer common sense problems; he could not form sentences containing 3 given words, nor arrange the 3 words in 2 sentences; though he gave 60 different words in 3 minutes, he repeated some words a number of times; he failed to rearrange the words of the jumbled sentence so that they would make sense.

This boy was seen three days later at the Detention Home and several times after that. Though every effort was made at these interviews to explain that there was no occasion for fear, we felt we were not entirely successful. Often he seemed on the verge of tears, yet he was not nearly so disturbed as when seen in court. The results on many of the tests were decidedly better. Both crossline tests were solved correctly; arithmetic proved difficult for him but he gave the difference between 100 and 87 cents correctly by means of counting on his fingers. By Binet scale he graded one year higher. He now gave the 12-year sentence containing 3 words correctly; rearranged the jumbled sentence; in fact, succeeded on all the previous failures except the incongruities, the common sense judgment test, and the definitions. He gave 40 words in 1′ without any repetitions, and 83 words in 3′, including 3 repetitions.

Case XV.—In another instance, a girl 13 years 4 months was being examined. It was difficult at best to be sure of a diagnosis, because the girl had been a comparatively short time in this country and was handicapped by language difficulties. She was seen by two different examiners on different days. On first testing she graded $9\frac{3}{5}$ years by Binet, but even more significant was the fact that she was unable to do the simple construction test, having failed on it at the end of 5′. She likewise was unable to solve correctly the simple crossline test, though both of these should have been well within her powers, if normal. As a result of the first day's examination it was considered very probable that the girl was distinctly subnormal.

During examination on the second day, she worked interestedly, coöperated well, and seemed thoroughly at ease. The results of the tests, as a whole, were considerably better; not only the simpler construction test but one involving more complex relationships was solved well. The simpler crossline test was correct on the first trial and the more difficult one on the second. One found that she could form new associations promptly; that she had good apperceptive ability and exceedingly good rote memory. Three Binet tests, formerly failures, were now scored as correct, thus giving her a Binet rating of 10 years.

Asked for an explanation of her poor record when first seen, the girl herself said, "I was afraid and nervous the other day." No doubt this was the real explanation of her apparent stupidity and of the decided improvement shown on the second testing.

(*d*) *Sheepishness or Feeling of Shame.*—Sometimes the examinee is not so much afraid or depressed or angry, but is generally ill at ease and somewhat ashamed because of the difficulties in which he has become involved. The mere fact of being examined is, in itself, sometimes a cause of shame. It is not at all uncommon for adolescent boys, particularly, to act in a very sheepish manner.

Case XVI.—A lad of 16, who was first tested before his story was gone into, failed on a number of tests. He could

not do an example in simple long division; he could not succeed with the more difficult crossline test and he filled in the spaces of the pictorial completion test very poorly, although when cross-questioned he could give correctly the meanings, appearing to have really apperceived the situations. All the Binet tests were done well; it was felt that the boy was not doing himself justice on many of the other tests.

Then there followed an interview with another experimenter. After he had unburdened himself and realized that he was not going to be very severely condemned, he appeared much more serious and more at ease. He was asked on the same day to try again a few of the tests previously done, and it was found he now solved the same problem in long division correctly, that he gave the correct solution of the crossline test on the second trial, and did the completion test very well.

(*e*) *Shyness.*—Because of shyness and timidity younger children especially are often exceedingly unresponsive. Sometimes it is impossible because of this to continue the tests and one must first endeavor to make friends. We may note as an example Case XVII, a little boy of 10 years, where our psychological impressions run as follows: "He is extremely quiet and diffident. It is difficult to make friends with him. He seems quite averse to speaking, but it is not due to a lack of knowledge of English. All language tests are failures largely because the boy will not speak."

This first day's testing proved to be practically valueless, for the boy failed on our simple picture puzzle test and on the simpler construction test. On the completion test there were 6 errors, 4 of them illogical. The Binet rating was $8\frac{1}{5}$ years.

No effort was made to retest this little boy for some time. It was thought that after he became more at home and had seen us during his play time, perhaps he would feel less shy when brought to the laboratory. This reasoning proved to be correct, for on the second trial the results were markedly different. The picture puzzle was solved correctly and the first construction test done with a very good record. Not only that, but the more difficult construction test was solved correctly too. The completion test, on retrial, was completed with no errors and his Binet rating was now through 10 years.

(*f*) *Embarrassment due to Onlookers.*—As stated briefly elsewhere, extraordinary conditions, over which one sometimes has no control, may interfere to such an extent that test work is valueless. If visitors are present the examinee may become so embarrassed and confused that he fails utterly on things well within his power. If one wishes to be fair and to learn the best of which the individual is capable, the presence of visitors at examinations should be discountenanced.

Case XVIII.—Recently we had a striking illustration of this point. We were compelled to see a boy when three spectators were present. They were seated in such a way that they faced the boy, who, therefore, never for an instant was unconscious of their presence. His embarrassment was as evident in his general manner as in his failures on tests, which he later did satisfactorily.[1] At the first interview his Binet record was as follows: All 9-year tests correct; three failures in the 10-year group, and three in the 12-year group. He did not solve the more difficult construction test, repeating the same impossibilities over and over in a most stupid fashion. The crossline test seemed easy for him and was correct on the first trial. But on the pictorial completion test he made 2 errors; he likewise made several errors in addition and became hopelessly involved in a problem in long division.

Several days later this boy, 16 years of age, was seen alone. Now all the 10- and 12-year Binet tests were correct except definition of abstractions in the 12-year group; no errors were made on the completion test; the construction test was done in 44″ with no incorrect or unnecessary moves. Number work was still poorly done, this being the field of his greatest weakness. The boy himself said, "I got rattled the other day, there were too many people around."

[1] Of course, if visitors make any kind of comment the situation is all the worse. This is illustrated in the case of a girl first seen in another clinic where visitors were present. With us this girl did test work very well, indeed, showing a very nice attitude. At the completion of the work she told us in detail of her previous experience, and that she had not only been greatly embarrassed, but much humiliated because of the obvious recognition of her failure by these visitors. She acknowledged that after noticing their amused smile she felt resentful and angry and made no further effort to succeed. Our positive findings rank this girl as quite fair in ability, whereas the verdict of the first examination had been that she was a mental defective.

(*g*) *Homesickness.*—The emotional disturbance, due to homesickness, is, in reality, a kind of mental conflict. This has been made much of in foreign literature.

Case XIX.—An instance in which it is a factor is next presented: Seen and tested on several occasions the most significant feature, in general, regarding this case is that the results varied greatly from time to time. There was no explanation of this other than the emotional conditions under which we found the boy on different days. He cried very readily, told us of his extreme homesickness, and when one day his mother came to visit him and the two met in the laboratory we ourselves saw a long-continued display of emotion on the part of the boy.

It was soon noticed that he was lacking in powers of concentration and attention, but that he could put his mind on what was asked of him when he was interested, and that his attitude was largely dependent on the way one approached him. The first day this little boy was seen he was most unhappy and homesick; he cried bitterly. He failed on many of the tests, even the construction tests, which later interested him greatly. His Binet grade was $8\frac{3}{6}$ years. He read poorly even a first-grade passage and failed to do a simple problem in addition.

Seen several days later he showed considerable improvement on some of the tests first tried, then once more was overcome by his emotions, cried again, and test work had to be stopped. It was on this second occasion that his mother came while he was working.

At the third interview Binet tests were given again, with the result that he then graded $9\frac{4}{6}$ years. The construction tests, previously failures, were now solved correctly. He succeeded with the simpler crossline test on the second trial, changed his record on the completion test from time reaction of 7′ 17″ to 5′ 12″, 5 illogical errors to 2 logical ones. Thus the results as a whole were quite different from the first ones.

(*h*) *Mental Conflict.*—Before leaving the general subject of emotional disturbance we must discuss, if only briefly, the problem of mental conflict. Naturally conflicts, on whatever

basis they arise, cause great emotional upheavals, and these we would expect to find reflected more or less vividly even in the reactions to tests. This is not true in every case. The victim of some conflict may show emotional distress only when his particular problem is approached, or when some association is evoked which is connected with it. But there are instances where worry or unhappiness on the basis of some conflict is so great that it influences all reactions. Almost any type of behavior may be the result.

Case XX.—This is well illustrated in the case of a boy 12 years old when first seen. Everyone who came in contact with him felt that there was something unusual in his mental attitude; school teachers, attendants in the home where he was being held, even his mother commented upon this fact. He was seen in the laboratory a number of times. There too it was felt that the boy displayed extreme obstinacy and recalcitrancy. He would work well on a few tests, then would sham disability, and at times refuse absolutely to coöperate. At the beginning of testing he was decidedly surly, saying he did not like any games. He never smiled, nor in discussing his own delinquencies did he show any remorse or approach tears. One was sure that he was not making his best efforts. As in an earlier case (Case X) this boy did better on performance tests. He solved the simpler construction test in 2′ 5″, making in all 15 unnecessary moves. At the expiration of 2′ he himself said, "I can't do it," although with 5″ more effort he succeeded. He failed on the simpler crossline after four trials, but succeeded on the more difficult one on the first trial.

Seen a month later the boy not only did the simpler construction test in 30″ (not a very significant performance, since he may have remembered the solution) but the more difficult construction test was done in 35″ with not a single unnecessary move. The simpler crossline test was correct on the first trial. This boy has been seen on numerous other occasions at varying intervals, and we have come to the conclusion that he is quite capable, and that his earlier failure was not due to lack of ability.

It was felt from the start that in this case the mental

attitude was not that of defiance, nor did the boy display a grudge-like attitude. It was simply a matter of stubbornness and recalcitrancy. After repeated interviews it was definitely proven that this attitude was based upon a conflict regarding sex affairs, which colored this boy's reactions toward everyone. Of course in a case of this sort the appreciation, not only of the attitude itself but of what causes it, is of great importance in relation to social behavior as well as to the interpretation of test results.

V. *General Nervous Excitement.*—The very effort to do well may sometimes prove as disastrous as its direct opposite, namely, indifference or ennui. We have seen instances where the examinee in his effort to attain an exceedingly good result, becomes so excited that he defeats his own ends.

Case XXI.—After seeing a girl 17 years of age it was stated; "Test work with this girl was very unsatisfactory, not because the girl would not coöperate, but because during the work she became a good deal confused. This was due to the very effort she made to do well. One would hesitate to judge of her capacity by the results of this interview, for it was evident that the girl was not doing herself justice; indeed this was so apparent that it was hardly worth while to do more with her."

Fortunately we were able to study this case further about two weeks after our first interview. This time she was quieter and more controlled. A comparison of the results on the two occasions shows significantly the truth of our earlier impressions. Though a grammar-school graduate, on the first examination she succeeded on the crossline test only with great difficulty; on the code test she made 7 errors besides omitting all the dots; she made a very poor record on the Kraepelin continuous subtraction test and 3 errors on the antonyms test. At the second interview the crossline, with letters substituted for numbers, was done promptly on first trial; the code with 2 errors but no dot omitted; the antonym test still had 3 errors, but the average time was somewhat better.

Case XXII.—A still better example is the case of an exceedingly bright boy not yet 13 years old, who showed great eager-

ness to make an exceptionally good record. He asked continually if he were doing better than his older brother, and grew excited at his own successes. He showed this by his poor mental and psychomotor control as well as by his general reactions. No effort was made to stimulate him, but on the other hand no attempt was made to quiet him at the first interview. The boy himself expressed a desire to come again to the laboratory and try again 'the games,' as he called them. At the second interview he was urged to work quietly, to take more time, and to be more deliberate; he was reminded of these instructions once or twice during the work. He himself saw the advantage of this and made an effort to control himself. It is interesting to compare the results of the two days' work.

The construction tests are not very illuminating, because the boy remembered the solution and so naturally made a better record. But the simpler crossline test, correct only on the fourth trial the first day, was now done easily on the first trial, though the letters were used in place of numbers and the order of placing the letters was altogether changed. The second crossline, a failure the first day, was promptly solved on the first trial, with change of numbering and placing of the numbers. The record on the tapping test changed from 87 dots with 6 errors and 78 dots with 2 errors, to 76 dots 0 errors and 77 dots 0 errors.

On the easy opposites he made 1 error at each of the two test periods, but the average time of reaction was 2.3″ in one instance, and 1.5″ in the other. The range is 1.2″ to 5.8″, as compared with 1.2″ to 2.4″. Subtracting continuously 6 from 75, his record changed from 8 errors to 2 errors. Furthermore, the first day's work here showed great lack of control, the following being the typical responses: 79, 63, 57, 61, 55, 89; time required, first trial, was 2′ 18″ and 1′ 46″ on the second trial.

VI. *Lack of Confidence.*—Sometimes the attitude is more nearly that of cowardice than anything else. The boy or girl falls back upon the statement "I can't do that," and left unencouraged will remain content to fail. It is closely akin

to the discouragement that Ruger and Swift found in their adult subjects. Such persons are not so much incapable as averse to making an effort.

This was true in Case XXIII, a boy 13 years 6 months, brought to us as "probably feeble-minded and needing to be sent to the state institution." We could not agree with this diagnosis made, it is true, not on the basis of tests. We found that the boy was a school failure and that he believed himself incapable of doing anything intellectual. Urged to try, he did a construction test correctly, but he wished to give up altogether when the simple crossline was a failure at the second trial. He was made to continue, and he succeeded not only on this test but on the more difficult one. The same trait was shown throughout his work. Thus he succeeded in giving sixty words in less than 3′, though he said repeatedly, "That is all I know." Such cases require patience on the part of the examiner and frequent use of praise and encouragement.

VII. *Combination of Causes.*—In some cases the explanation is not so simple; the problem may not be an easy one to analyze. Sometimes it is evident that there are disturbing conditions, that the mental attitude is unsatisfactory, but one does not feel sure just wherein the trouble lies. Two or more conditions may seem to be factors, and this makes it at times exceedingly difficult to reach any definite diagnosis.

Obvious recalcitrancy may be upon the basis of some conflict or grudge, in this respect differing from the case cited above, where no motive was ever discovered; or, bad physical conditions may be present and it may be difficult to know just how much allowance should be made for this. We cite one instance where a number of factors complicated the situation to such an extent that only a tentative diagnosis was vouchsafed, even after repeated study. Not until several years had elapsed and some of these factors were eliminated, was enough confidence felt in test results to make us willing to offer a definite statement regarding this girl's mentality.

Case XXIV.—A little girl, 10 years 3 months, was studied after she had already been very delinquent. When first seen,

she was exceedingly downcast; she wept copiously and frequently. In the school-room she was said to be naughty and stubborn. It was known too that she was engaging in bad sex habits.

The most striking feature of early work with this girl was the excessive inhibitions shown on tests, in conversation and in the school-room. After a few tests were done she would put her hands over her face, avert her eyes, refuse to speak, and begin to weep bitterly. Although seen on three different occasions, on all of which the greatest kindness was shown her, the diagnosis of her mentality was left an open question. At the first interview she made a fairly good record on the simple picture puzzle and on the simpler construction test. She failed to solve the more difficult one, refusing to work at the end of 7′. Seen the next day she failed on the simpler crossline test after four trials, refused to attempt the more difficult crossline test, would not answer any tests where the solution required the use of language, refused to do any school work.

It can readily be seen that at this time one could not possibly state whether this girl was unable to do the tests, whether she merely refused on a basis of recalcitrancy, whether she was dull from her bad sex habits, whether she was developing a psychosis, or whether her peculiar inhibitions were due to some mental conflict which her experiences, too long to recite here, made possible.

Seen a year later, in general her reactions were much the same. She still showed interest in performance tests where she could handle concrete material, but the tests previously failures were still done as poorly. The girl refused to attempt Binet tests involving language, and in more difficult tests where continued effort was required she refused to coöperate any length of time.

Just recently, more than four years after first knowing the girl, we have once more studied this peculiar problem. We find her attitude much changed. She has been for a long time in an institution where a great deal has been done for her. At our last interview she coöperated apparently as far as she was able, was friendly, and showed none of the extreme inhibi-

tions previously so characteristic. We feel now that the results of tests are trustworthy and give us a basis for diagnosing her mentality. We find that she still does performance tests extremely well; she succeeds with the simpler crossline test, but is still unable to cope with the more difficult one. By Binet tests she grades through all of the 10-year series and does well three of the 12-year series. She has had good school opportunities, but is quite retarded in this respect. In number work she can only do problems in addition, while her reading for a girl of her age is distinctly poor. From these results, we must conclude that the girl is subnormal.

The final diagnosis in this case is not the point of greatest interest from the standpoint of our present discussion. It illustrates well the time and care that are sometimes needed in the understanding of a problem. There is no doubt that when first seen all the significant features noted were real factors. There are many cases where the only fair conclusion is that no definite decision can be reached. Only follow-up and retesting can lead to a diagnosis that is at all reliable and worth while.

Turning to the positive aspects, we must emphasize particularly several factors. Not only should thought be given as to the time and place of examination, and not only must the experimenter possess sympathy, tact, and skill, but he must win the subject's active coöperation. We would stress the value of presenting an aim or motive that has meaning for the individual. The experimenter must beware of simulation on the part of the examinee, and he must analyze sufficiently all reactions, particularly negative findings, in order to know whether they are really indicative of disability, or whether they are symptoms, or even possible symptoms of disturbed conditions.

The most favorable attitude, no doubt, is that of the ambitious, but well-controlled person, the person who does not allow his emotions to interfere with his mental processes, and who yet is interested enough to exert himself to his best efforts. The particular means of creating this attitude varies with each individual, but we can only hope to achieve or approach it by recognizing the various pitfalls and by endeavoring to avoid them.

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